



THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTION

First national  
MATERIAL HANDLING  
EXPOSITION

announced for

January 1947

see details page 19

SEP 5 1946

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OF TEXAS

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IN THIS ISSUE: They're on the Way.. First Nat'l Material Handling Show.. Wire Co  
Flexibility of Standard Equipment.. Sound Handling for Sound Expansion

# IT'S A LONG HAUL TO TIPPERARY



Donkey power hauls bogland peat so that Irish fires may be kept burning. Proving in primitive fashion that compact carriers—properly balanced—do a hefty job of lugging. Done for industry in modern manner by Truck-Man.



**\$675<sup>00</sup>**

F. O. B.  
Jackson, Michigan

The Truck-Man is untiring, obedient, trustworthy. But surefooted and nimble to negotiate factory aisles and narrow passages. Equipped with gasoline power—two speeds—dead man brake—one ton capacity. Hydraulic lift raises the load gently and lowers it with cushioned smoothness.

*Write for descriptive literature.*

Limited Open Territory for Substantial Distributors

## truck-man

a product of

**YARD-MAN, INC.**

1418 West Ganson, Jackson, Mich.

SE

XUM

"I amazed our board when I showed them a 55% savings in material handling"

Turns  
OVERHEAD INTO  
PROFITS

WE WANT LABOR  
TO SHARE  
THE BENEFITS

## Let an A.T.C. Specialist do the same for you!



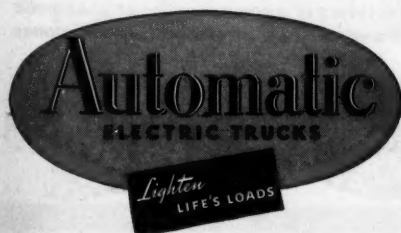
Yes, such savings are possible. An A.T.C. Specialist will show you the record—give you proof that Automatic Fork Trucks bring business real profits... the dollar profits that 55% material handling savings represent.

These brawny giants of electric power have so many money-saving, energy-saving applications in your plant. By unit load pallet and skid principle, they move materials into, through and out of your

plant with easy efficiency—spare your workers gruelling work, make money for you where it formerly was costing you money.

No material or product is too cumbersome to lift, move or stack. You can store your products ceiling high. One man does it, where three or four men hand stack only half as high. You add storage space, release labor for more productive, pleasant work. Product damage is cut down, accidents lessened.

Give your business this chance to turn a fixed overhead into a fixed profit, while you lighten labor's load. Let an A.T.C. Material Handling Specialist survey your material handling. Mail the coupon.



### AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.

141 W. 87th Street, Dept. P, Chicago 20, Ill.

Please mail me, without cost or obligation, complete facts about AUTOMATIC FORK TRUCKS.

( ) Have an A.T.C. Material Handling Specialist call.

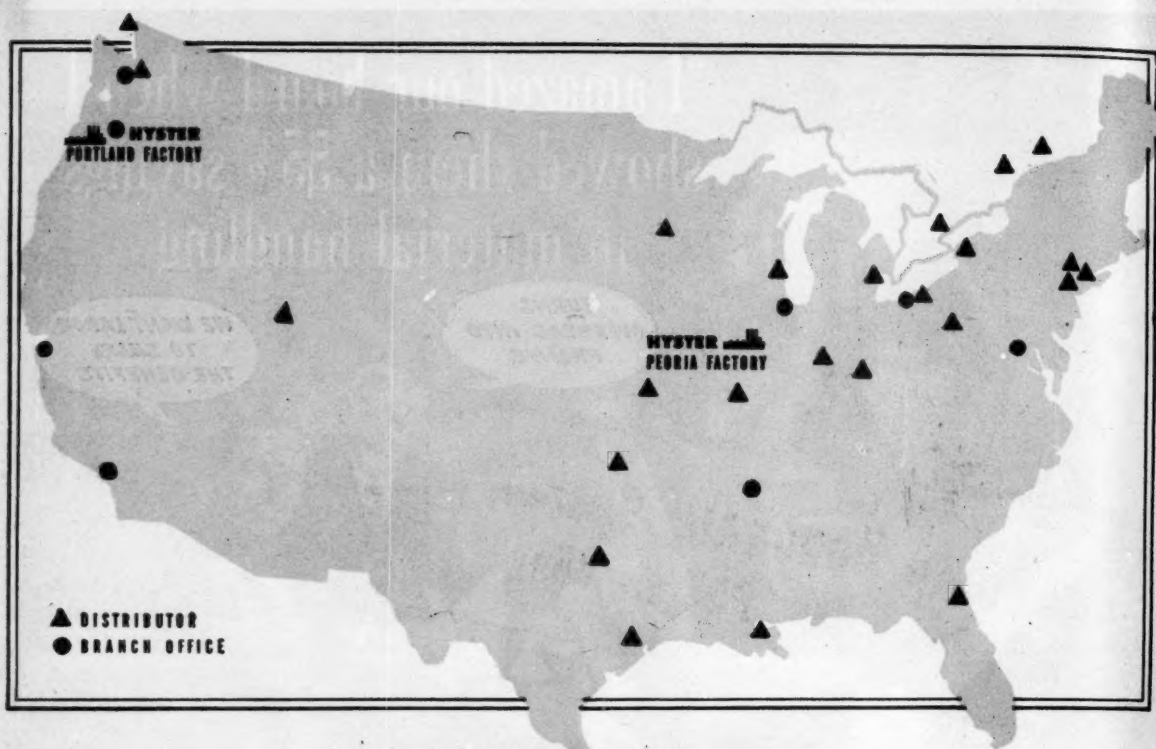
Company Name.....

By.....Position.....

Street Address.....

City.....State.....

SEPTEMBER, 1946



# HYSTER

## LIFT TRUCK SERVICE COVERS THE COUNTRY

**33 HYSTER DISTRIBUTORS AND FACTORY BRANCH OFFICES GIVE HYSTER OWNERS COAST-TO-COAST SERVICE...**

**HYSTER** owners throughout industry have rapid service on genuine Hyster parts and on mechanical maintenance.

Nation-wide parts and mechanical service is available through 2 Hyster factories, 8 Hyster branch offices and 23 Hyster distributors—a total of 33 centers.

This network of Hyster service facilities provides two important features:

1. Strategically located supplies of genuine Hyster parts.
2. Factory-trained mechanics ready to render special service.

Hyster lift trucks get around-the-clock use, meet both production and utility demands.

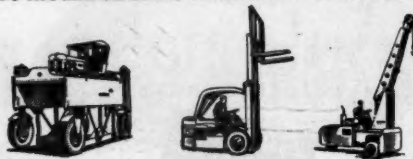
When either parts replacements or service attention is required, both are quickly available. *Hyster's Service Department, like Hyster's Sales Department, covers the country.*



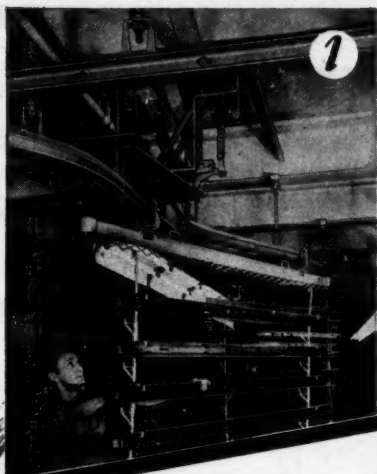
**HYSTER  
COMPANY**

2931 N. E. Clackamas St., Portland 8, Oregon  
1831 North Adams Street, Peoria 1, Illinois

*Manufacturers of a complete line of pneumatic tire lift and straddle trucks and mobile cranes*







## AMERICAN MONORAIL *System* Uses Power for SPOT Handling

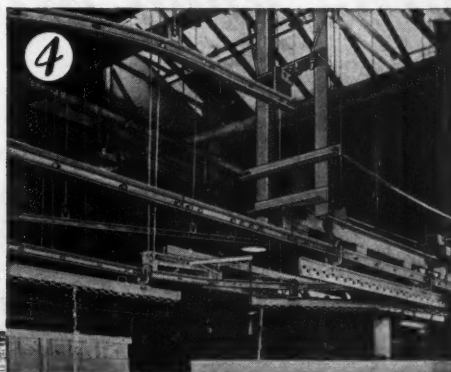
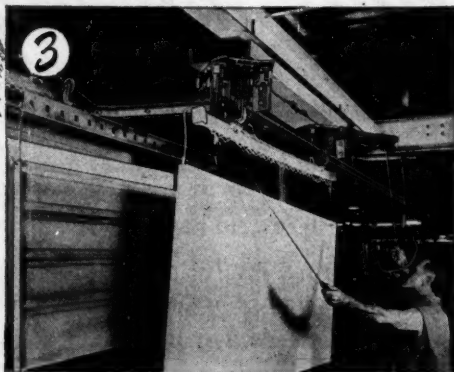
Extreme flexibility of movement is carefully maintained in this hand operated American MonoRail System. Where quick change of trolley travel or passage of carrier through process is required, power driven equipment takes care of such spots as . . .

1. Trolleys on parallel tracks automatically brought into single track alignment by solenoid operated switch.
2. Carriers roll on track sections for *vertical* passage through degreasing tank. Cleaned

parts move down the line to spray booths.

3. Crosstrack switches provide 90° transfer to shipping area as carriers roll off power conveyor in finishing oven.
4. Empty carriers raised to high level track for gravity return to loading station.

American MonoRail Engineers, with their wide experience in solving difficult handling problems, will gladly consult with you. Send for Bulletin C-1 illustrating hundreds of similar operations.



# THE AMERICAN MONORAIL COMPANY

13129 ATHENS AVENUE • CLEVELAND 7, OHIO

SEPTEMBER, 1946

*"Strategic Spotting!"*



**OF G-E  
COPPER-OXIDE  
RECTIFIERS**

*helps keep materials moving!*

By charging electric truck batteries right in the areas where they work, you gain time for *more* work and handling. Why lose good time routing tired trucks to an inconveniently located battery room?

Locate G-E copper-oxide battery rectifiers in the plant or warehouse, in heavy traffic areas where they are always ready for use. When a hand truck battery needs a lift, it's a simple operation for the driver. He sets the control, and the charger takes over to finish the job, cutting out when charge is complete. No danger of overcharging, power and costs are reduced.

This "Strategic Spotting" of G-E rectifiers, locally, permits a useful noon-hour boost to keep your trucks up to par. G-E copper-oxide chargers for lead-acid batteries, for nickel-alkaline batteries, and for combination use are priced low, and are made in capacities to meet your battery needs. For illustrated booklet and complete information, write Section A27-9137, Appliance and Merchandise Dept., General Electric Company, Bridgeport 2, Connecticut.

**GENERAL  ELECTRIC**  
A27-9137

FLOW

# Engineer THE MERCURY "TRACKLESS TRAIN"

deliver MORE tonnage in LESS time at LOWER cost!

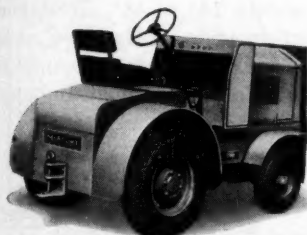
One man or woman can "engineer" the Mercury "Trackless Train" and do the work of many—deliver more tonnage in less time for less cost.

Keep loads rolling because "The Trackless Train" keeps them on wheels, ready for long or short hauls, free of any fixed track. No lost time . . . no wasted motion.

It will pay you to investigate "The Trackless Train" NOW. For complete details on "The Trackless Train" as well as specifications on all Mercury equipment—request Bulletin 201-6.

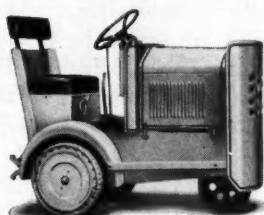


Mercury "Tug" Electric Tractor provides fume-free motive power for this train of Mercury Type A-310 Trailers.



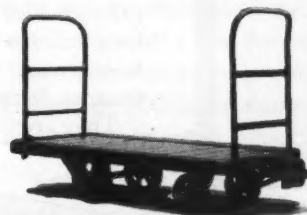
## "HUSKIE" GAS TRACTOR

"Huskie" is the word for this powerful, 6 cylinder, 4 wheel tractor. A real work horse—built to haul any wheeled load it might encounter in industry—so compact that it can operate in limited areas.



## "BANTY" GAS TRACTOR

Meet the "Banty". Smallest tractor made, yet develops a draw bar pull in excess of 2000 pounds. Stamina, power, and small size make the sturdy "Banty" a favorite with industry.



## TYPE "A-310" TRAILER

This all-steel trailer is the burden-bearer of "The Trackless Train." An all-purpose, castor-steer trailer available in wide range of platform and body types. Hundreds of thousands now in use demonstrate the popularity of the "A-310".

## FORK TRUCK—"TRACKLESS TRAIN"

When moving materials over 200 feet you can do it more efficiently and at lower cost with the Mercury Fork Truck "Trackless Train". Fork Truck loads trailers; tractor hauls trailers to destination.

## THE MERCURY MANUFACTURING COMPANY

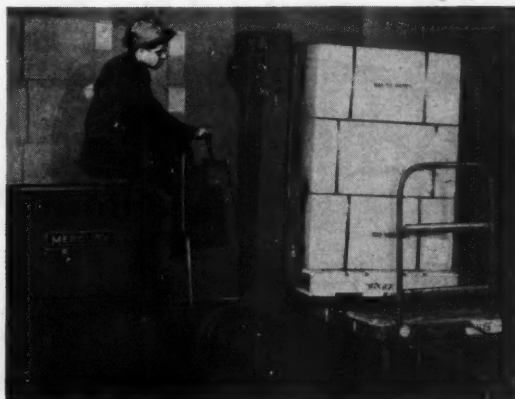
4154 S. Halsted Street, Chicago 9, Ill.



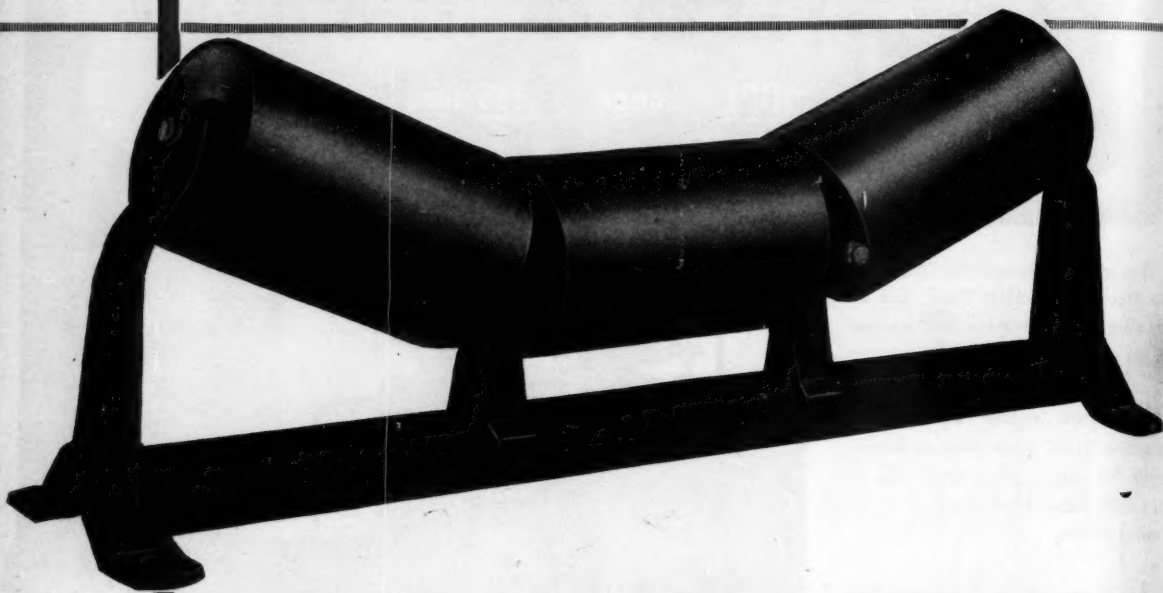
# MERCURY

TRACTORS · TRAILERS · LIFT TRUCKS

SEPTEMBER, 1946



# FOR MEN...



## who are looking ahead...

• B-G Belt Carriers enable many operators to look ahead toward long years of low-cost material-moving service. Skillfully welded, practically unbreakable, they roll on bearings that are sealed to keep grease in—dust out. Their maintenance demands are next to nothing.

They are equally preferred among fore-

sighted plant superintendents for replacing wornout carriers—and for use in modernizing entire materials-handling operations. Belt widths 16" to 48", in various types. For information on Barber-Greene Belt Conveying Equipment, see your B-G representative. Barber-Greene Company, Aurora, Illinois.



**TRUSS FRAME**

Standardized units, rigidly constructed, factory aligned, for easy assembly on the job. 12", 24" and 42" depths.



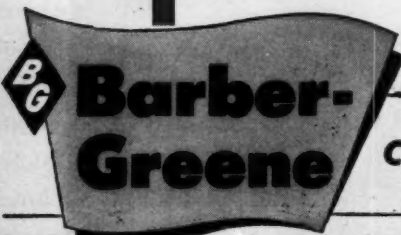
**CHANNEL FRAMES**

Simple, self-contained units quickly erected—available in 8 and 9 foot lengths.



**DRIVES—TAKE-UPS—ACCESSORIES**

Wide variety of pre-engineered units to meet particular requirements. Each unit complete, ready for installation.

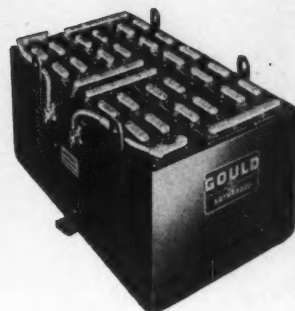
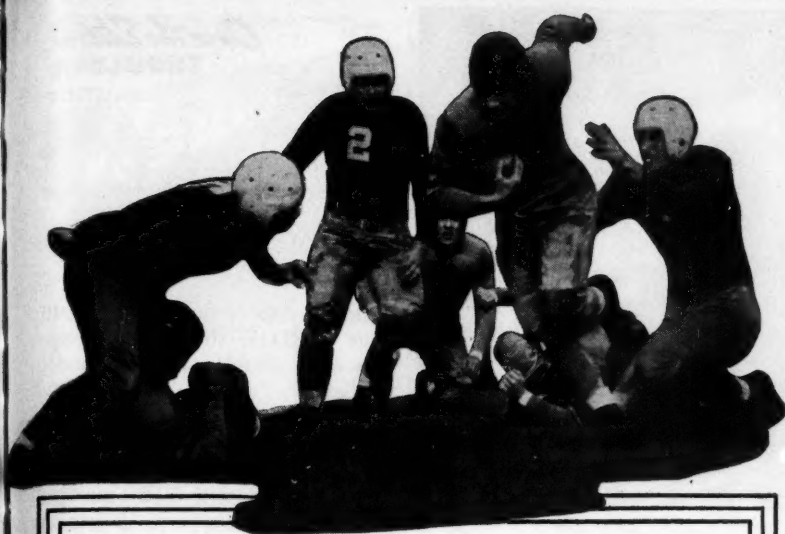


## CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES





## SCORING POWER

**Gould Kathanode Batteries  
deliver full power longer**

**MEMO**

*Bill:  
Those Kathanode  
powered trucks  
keep going all day  
It was smart to  
switch. J.L.B.*

**Materials Handling  
Supervisor**

Kathanode powered industrial trucks stay in the game, moving at full speed right up to the closing minutes of each working day. They will not be called to the side lines for battery changes due to failing power.



**THE BATTERY PICKED BY ENGINEERS**

**GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.**  
Service Centers: Atlanta • Boston • Buffalo • Chicago • Cincinnati  
Cleveland • Detroit • Kansas City • Los Angeles • New York  
Philadelphia • Pittsburgh • St. Louis • St. Paul • San Francisco • Seattle

**And here is the reason  
why—**



Gould introduced, and for 21 years has developed, the spun-glass mat. Placed on both sides of each positive plate in the Kathanode battery, these mats hold all useful active material within the grid. There it continues to produce current at 100% or more of the battery's rated capacity.

Kathanode's exclusive construction means more power. Get the facts by writing Dept. 79 for Catalog 100 on Gould Kathanode Batteries for Industrial Truck and Tractor Service.

# GOULD



## KATHANODE



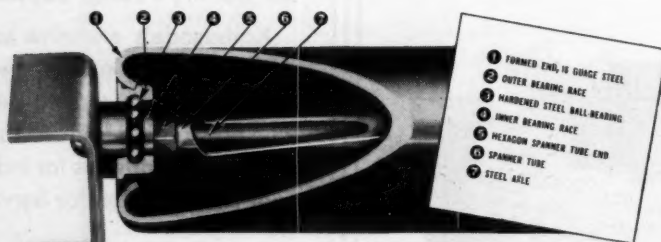
## New Rapid-Roller Conveyors

**Handles Boxes - Crates - Cans  
Kegs - Drums - Lumber**

Rapid-Roller Conveyor can easily adapt itself to your material handling problem, do the job quickly, and pay for itself by eliminating old-fashioned hand-moving methods.

Rapid-Roller will move anything with one firm, free-running surface such as cans with chimes, kegs, drums, light steel bars, angles or lumber.

Rapid-Roller's unique frame and roller construction combines sturdiness with minimum weight. The frame is made of 12-gauge steel . . . cross-braced and arc-welded. Will carry 800 to 1,000 lbs., recommended maximum weight distributed over a 10' section.



The exclusive new inner design of the roller includes a steel tube spanner bushing with hexagon-shaped ends which houses the roller axle and locks the inner race of the bearing to prevent its turning while rollers are rotating. This permits simple removal of the axle itself from the conveyor frame when changing spacing of rollers.

Write for free literature today

OFFICES IN PRINCIPAL CITIES



Manufacturers of  
STEEL FORGED CASTERS • TRUCKS • CONVEYORS • POWER BOOSTERS

*The Rapids-Standard Co., Inc.*

Sales Division—377 Peoples National Bank Bldg., Grand Rapids 2, Michigan



To FLOW:

*Two in One*

On page 39 of the January 1946 issue of FLOW there is a description of a double platform model lift truck.

We will appreciate it very much if you will advise us where this type of equipment can be obtained, or whether it is on the market. Thank you for your assistance in this matter.—D. M. R. Mills, Industrial Engineering Department, Fulton Bag & Cotton Mills, Atlanta, Ga.

*While this double-platform truck is not standard equipment, it is made on special order by some material handling equipment manufacturers.—Ed.*

To FLOW:

*Handling of Bottled Goods*

As background material for an article on the use of pallets scheduled for a forthcoming issue we would greatly appreciate your forwarding us a copy of the recent issue of your magazine in which a story on the use of pallets was printed.—Lloyd S. Koppel, American Brewer Magazine) New York City.

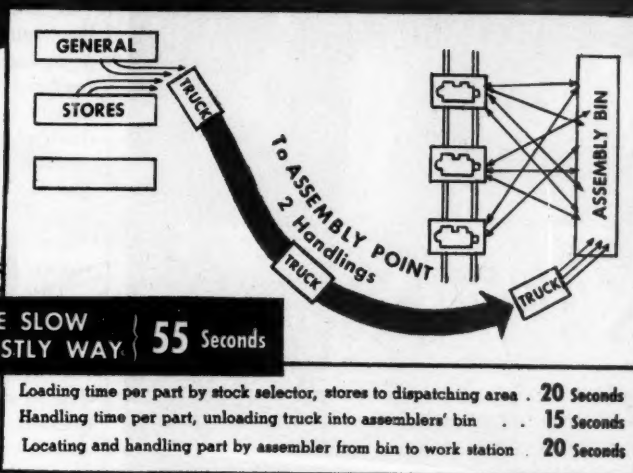
*Presumably the American Brewer, oldest U. S. publication serving this industry, has reference to the article "It Hits the Spot", which appeared in the April issue of FLOW. While FLOW has featured numerous articles on palletization, this one dealt with the program of the Pepsi-Cola Metropolitan Bottling Works, Long Island City. A novel feature of this operation was delivery by use of a river boat.—Ed.*

To FLOW:

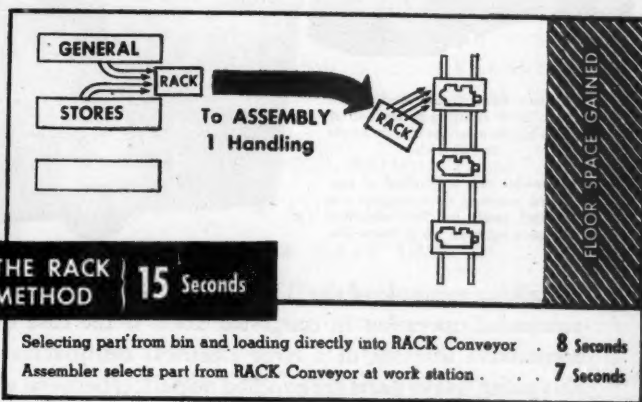
*"Enjoyed Article"*

I so enjoyed your article, "High Speed Line for Safety Glass," in your July issue, that I am desirous of obtaining a copy of this interesting story to pass on to a friend.

# How save 3 MAN HOURS per day



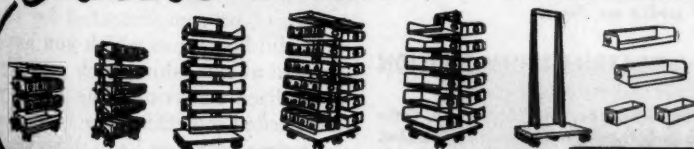
NO MATTER WHAT YOUR PRODUCT—YOUR PROBLEM IS THE SAME—TO CUT DOWN THE COST OF MATERIAL PLACEMENT; INCREASE ASSEMBLIES!



In this installation, six parts comprise an assembly unit. By saving 40 seconds on each part, 4 minutes were saved per unit. Since one operator assembled 50 units a day, 200 minutes were saved each working day per operator by the Rack method.

## Rack CONVEYOR SYSTEMS

Over 300 Leading Manufacturers Use



6 of the 18 Rack Units Available

Let us analyze your material placement problem... no obligation!

We are prepared to make a complete study of your material placement problem, with a time-study of every factor entering into this vital phase of production. No obligation—write us at once.

**RACK ENGINEERING COMPANY**  
PITTSBURGH 1, PA.

New York • Philadelphia • Cleveland • Detroit • St. Louis • Chicago

SEPTEMBER, 1946



# BAKER *Articulated* FORK TRUCK places loads at RIGHT ANGLES to 7 ft. AISLES!



*Above*—Baker 2-ton Articulated Fork Truck spotting pallet load of parts beside machine at right angle to 7 ft. aisle.

*Right*—36 inch pallet-load of machined pedestal shoe castings are handled easily in close quarters. Distance between white lines—7ft.

A striking example of the BAKER *Articulated* Fork Truck's successful operation in congested areas is the case of the locomotive division of a large electrical manufacturer. In this plant, heavy parts are handled on pallets between manufacturing processes. Conventional power trucks could not be used effectively because many of the aisles were only 7 ft. wide. BAKER *Articulated* Fork Trucks satisfactorily solved the problem, enabling the company to mechanize handling operations without costly plant alterations.

*For complete information on Baker Articulated Fork Trucks get in touch with your nearest Baker representative—or write us direct.*



Member:  
Electric Industrial  
Truck Association

## BAKER INDUSTRIAL TRUCK DIVISION

of The Baker-Raulang Company  
2185 West 25th Street • Cleveland, Ohio  
In Canada: Railway and Power Engineering Corp., Ltd.

# Baker INDUSTRIAL TRUCKS

Thank you for this courtesy.—  
Warren A. Burdette, Baltimore 8,  
Md.

*This article covered the Ford  
safety glass plant at River Rouge.  
—Ed.*

To FLOW:

*Who Knows the Answer?*

A copy of the magazine FLOW has come to our attention. While your treatment of the subject of material handling is, of course, primarily from the standpoint of industrial plants, we should like to know if you can refer us to any articles or information on the subject of handling packages of merchandise received in department stores.

This division of the Dennison Manufacturing Co. produces machines and tickets that are used for the price marking of merchandise in department stores. In connection with our work with large stores, we are occasionally asked about the most efficient method of handling and distributing the packages that are received at the receiving platform. A large store will, as you know, receive two or three thousand such packages each day, and sometimes more.

It occurred to us that you may have seen some special studies in the handling of these packages and their distribution to the various points in the store where they are opened and checked, and we shall be very grateful if you can refer us to any such material.—V. Truitt, Dennison Mfg. Co., Framingham, Mass.

*The editors will appreciate hearing from any reader who can shed light on the problem outlined by Reader Truitt.—Ed.*

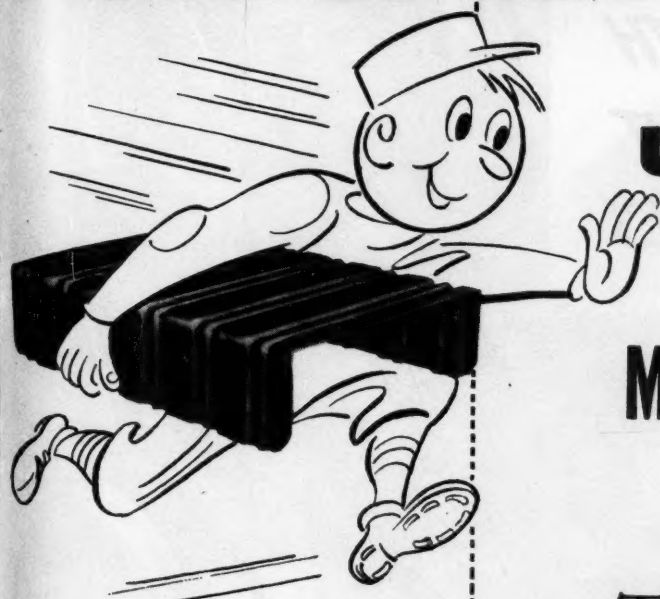
To FLOW:

*"Valuable Aid"*

We are a subscriber to FLOW and recognize it as being a valuable aid to our industry. We think you ought to be complimented for the splendid fashion in which you have arrived at publishing such a highly specialized magazine. The industry has needed something like this for a long time, and you have done your job well.—Oral T. Carter, Oral T. Carter & Associates, Materials Handling Engineers, Cincinnati 2, Ohio.



# FULL SPEED AHEAD!



*with*  
**UNION METAL**  
*Engineered*  
**Materials Handling**  
**Equipment**

**T**HOUSANDS of busy plant men in every American industry have proved to themselves the superiority of Union Metal's extensive line of materials handling equipment. Their wartime production experience showed them how these "tools"—strong steel skids, boxes and pallets—

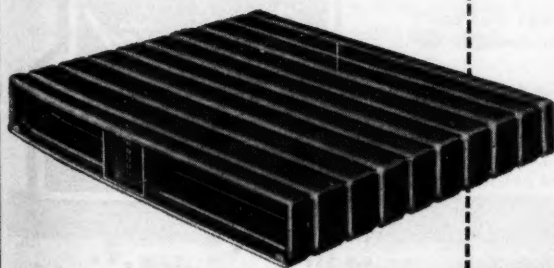
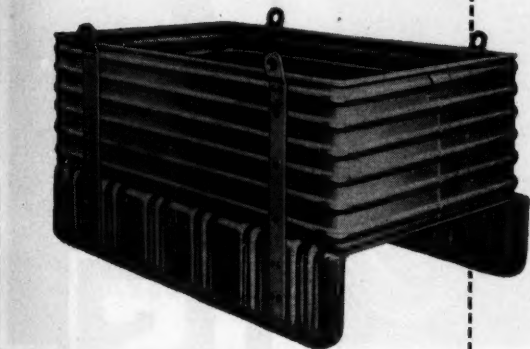
★ **SPEED PRODUCTION**

★ **CUT COSTS**

★ **SAVE TIME**

Union Metal's equipment is engineered by materials handling specialists to do its job with utmost efficiency. It helps you clear valuable floor space for increased production activity—handling all materials in time-saving, cost-saving unit loads.

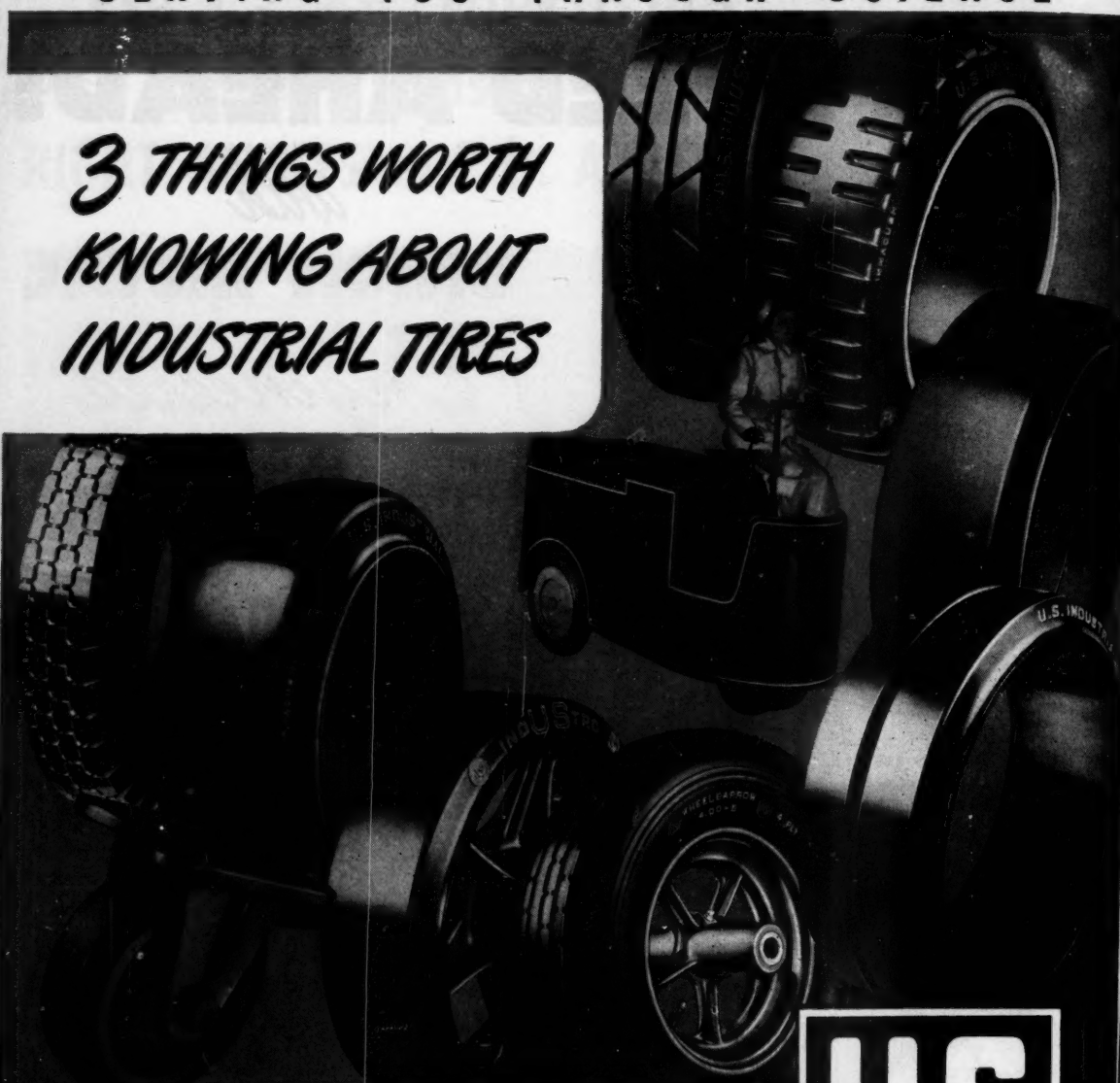
Stock items to meet standard requirements—special designs for your special needs. For complete information and able engineering assistance, wire, call or write The Union Metal Manufacturing Company, Canton 5, Ohio.



**UNION METAL**  
*Materials Handling Equipment*

SERVING YOU THROUGH SCIENCE

## 3 THINGS WORTH KNOWING ABOUT INDUSTRIAL TIRES

- 
1. This line of U.S. Industrial Tires is so *complete* that you'll easily find *just* the tire you're looking for.
  2. The *quality* of these tires is so high that you'll be *more* than satisfied with their strength, durability and performance.
  3. And each of these tires is backed by the day-to-day, expert *service* of your local U.S. Tire Distributor. He's as close as your phone! Call him—today!

**U.S.**  
*load-rated*  
**INDUSTRIAL  
TIRES**

YOUR U. S. INDUSTRIAL TIRE DISTRIBUTOR HAS *the right tire...  
the right service...  
for every job!*



**UNITED STATES RUBBER COMPANY**

1230 AVENUE OF THE AMERICAS • ROCKEFELLER CENTER • NEW YORK 20, N. Y.

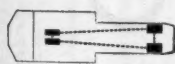


## **SALSBUURY TURRETEER** HANDLES MORE TONS PER HOUR, SAVES YOU MONEY. Get all the details...write for Bulletin 4602-7

Specifically designed to cut cost of horizontal movement of loads up to 4000 lbs. — more than 70% of all handlings. Can do the work of 6 men with hand equipment. Faster, more maneuverable than hand or power walking equipment. More economical and efficient than heavy-duty equipment.



Salsbury wide, 4-point load suspension



Conventional narrow load suspension

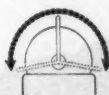
**MORE STABLE**—because of the exclusive Salsbury articulation which provides 4-point load suspension based on four widely

spaced rubber-tired wheels. Permits operation over sharp changes in grade levels or uneven surfaces without tying on loads. Such time-saving stability means the handling of more tons per hour.

**FASTER**—because the Salsbury Automatic Clutch and Automatic Transmission permits constant movement without delays for gear shifting. Utilizes power as needed. With 4000 lb. load and driver, Turreteer will operate 2 to 3 times as fast as comparable use equipment. Takes steep ramps in stride. It handles more tons per hour.



Salsbury 360° turning radius



Conventional 200° turning radius

**MORE MANEUVERABLE**—because power unit and drive wheel rotate with turret for steering. Full 360° turn. Reverses simply by changing direction of turret without stopping drive wheel. Turns in own length. This high maneuverability saves time in picking up, transporting and spotting loads. Result: it handles more tons per hour.

**MORE EFFICIENT**—because operator rides the load. Here is a gas-powered truck as simple to operate as any equipment made—throttle and brake are the only controls—no walking—no pushing—no fatigue. Operator can handle as many skids in the last hour as the first. Works 24 hours a day without stopping for battery charging. Cuts your costs because it handles more tons per hour every hour of the day.

For more complete information, send for Bulletin 4602-7

**SALSBUURY**  
**MOTORS, INC.**



Pomona, California  
A subsidiary of Northrop Aircraft, Inc.

Salsbury Turreteer—platform lift type • Salsbury Turretug—tractor type • Salsbury Turretruk—cargo type

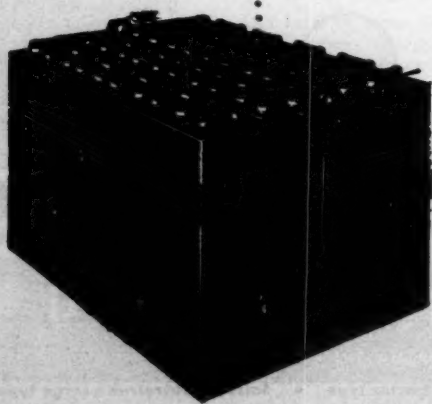
SEPTEMBER, 1946



*MODERN DESIGN  
GIVES 10%  
EXTRA CAPACITY\**



Today's indispensable team-mate of mass production is mass handling of materials, finished products and goods to process. And many producers and transporters are finding the answer in the pallet load system, handled by flexible, cost-saving electric trucks, powered with Philco extra capacity batteries. This extra capacity of 10% or more—an original Philco development—is now available in several modern Philco types, including the famous Philco "Thirty", the battery with 30% longer life. Write for specification data today. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.



*\*Modern construction...pioneered by Philco...  
gives 10% or more additional battery capacity.*

# PHILCO

FOR FIFTY YEARS A LEADER IN INDUSTRIAL  
STORAGE BATTERY DEVELOPMENT



# Flow

The magazine which integrates material handling equipment into the flow of production.

Vol. 1, No. 12

SEPTEMBER  
1946

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Pre-sized sheet steel being hoisted by overhead crane in receiving department, left.

# They're

THE last war brought home to many of us the importance modern refrigeration plays in our everyday lives, especially when we could not procure the refrigerator we wanted. It did not bring home the fact, however, that the advancements of a modern refrigerator are due not only to research and engineering achievements, but also to the efficiencies by which each component part is fabricated, handled and assembled into a complete product of beauty, convenience and economy with years of consumer satisfaction.

## Birth of a Refrigerator

To start at the beginning, we must go to the raw material receiving section on the first floor of this immense layout. Here the steel sheets for the cabinets are brought in sheared to size. On the second floor are located the machine tools which form these 12½-foot lengths. The steel is raised to this point by a powered lift which accommodates 60 sheets 22 inches wide. On arrival at the powered brake, they are removed and fed through this machine which notches the plates at points coinciding with the hinges on the finished cabinet.

After notching, the plate is moved to a roller conveyor which both precedes and follows a rafter roller. This machine is made up of a series of rolls about 24 inches wide and eight inches in diameter. The flat sheet of steel is fed from one end to the other which turns up a flange along the edge, in successive steps. Up to this point the shell of the refrigerator is still in a flat shape, which must be formed to obtain the typical curved top of the cabinet.

A machine known as a "bulldozer" is used for this purpose. Two

FLOW

SEP

# On the Way

**Material handling highlights from the refrigerator line of the Westinghouse Appliance Division, Mansfield, Ohio. C. D. Heaton, Assistant plant superintendent, explains how the miles of conveyor systems plus skids, dollies, lift trucks, etc., now produce thousands of units for America's living comfort.**

operators position the plate on it, while, under pressure, forming dies roll it around the middle section as the metal stands on edge. From this forming operation until the refrigerator is completed, a system of gravity rollers and monorail conveyor transports this part as well as the others in the assembly. In the next operations the front rail, bottom rail, support channels and gussets are welded to the outer shell. This assembly is placed on 36-inch gravity rollers positioned a few inches off the floor, and it is then rolled to the metal finishing section.

A belt conveyor used here is at the same height as the roller sections and keeps the part moving at a five-foot-per-minute rate, giving a progressive line handling. An inspector checks the cabinet on a surface plate for square bearing at the next station. If passed, the shell of a future refrigerator moves on a belt (horizontally) to the bonderizing department. This particular belt is rubber-cleated to prevent slippage of the parts as they are carried up an incline and deposited on another set of rollers, which coast them into the bonderizing section.

## Novel Spreader-Bar Carrier

This operation is made up of a series of "baths" which prepare the metal before painting and enameling. Since tanks and automatic spraying units are used the operations lend themselves to monorail conveyor handling. Solutions are

replenished from drums stored alongside the tanks by use of an overhead monorail hoist. Since the tanks on either side of the U-shaped area must be refilled at intervals, the monorail extends across the space and is accessible from both sides.

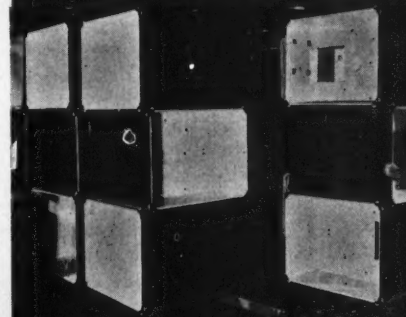
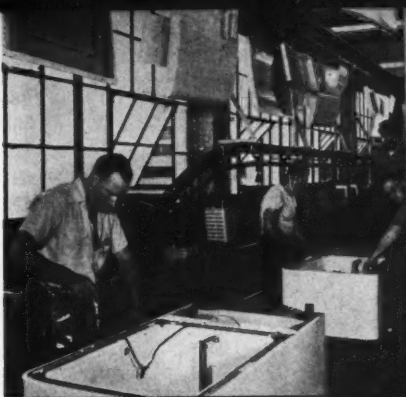
Equally effective is the method of arranging the parts (to be bonderized) on the conveyor. These consist of the outer door panel, the wrapper sheet (the one-piece outside part of the cabinet), the bottom pan and ends for the vegetable bin. Each adapter hook on the system carries the cabinet and the smaller parts, which means one hanger holds one set of parts.

As these are removed and hung on the painting conveyor, two cabinet hangers follow each other, which in turn are followed by one hanger which carries two sets of parts. The cabinet hangers, shown in a sketch, are made of two triangular-shaped pieces of heavy wire. These are mounted to a piece of  $\frac{1}{2} \times 2\frac{1}{2} \times 12$ -inch flat stock over pins at two points. The more weight is applied, the greater the resulting spreading action. Two pieces of angle iron welded at the two tips of this carrier catch on the bottom flange of the cabinet and support it.

## Cabinet Carried Upside Down

As you watch the long monorail conveyor moving the cabinets and

Hoist with special spreader bar moving material in vitreous plant raw storage, right.

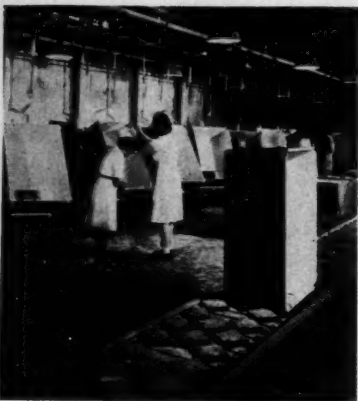


Handling of wheel conveyors with belt transfer





other parts through the various painting and enameling steps, you may wonder why the cabinets are hung upside down on the hangers. Further on in the line the answer



Refrigerator liners moving through the touch-up and final inspection stations.

becomes apparent. The top of the cabinet is rather awkward to paint when it is in an upright position. Furthermore, because of the contour of the top, handling devices would have to be specially designed and would probably interfere with the painting operation.

To solve this handling problem, the cabinets are simply supported upside down. A pit was designed in which an operator could stand while spray painting the top. In the station following, another operator sprays the sides which are blended with the already painted top. The shell then advances on the line until the finish is baked. From this point the unit emerges into the open, and the assembly begins. No paint is wasted. When it clings to the spray booths, it is scraped off and deposited in the water tanks below the line, along with the paint which splashes to the rear (water wash). From these gathering points it is reclaimed for use in other base coating operations.

#### Slat and Roller Conveyor in Assembly

By the time the cabinet has moved from the painting section into the assembly line, it is ready to have the service cord grommet added, and the toe plate painted. The latter is done by masking the white areas and spraying black enamel on, inasmuch as the lower trim of the cabinet is also black. In a spot inspection that follows dinges, scratches, dirt, etc., are re-

moved, and the outer shell or cabinet is then ready to be placed on a pallet that travels on a slat conveyor. This pallet is the bottom of the shipping crate; it remains with the cabinet until it is a finished refrigerator.

Since the completed refrigerator is composed of several major parts we will describe the handling of the unit (freezing portion), the food compartment, the door, the insulation, and the wire shelves.

#### Conveyor Coordinates Two Plants

The food compartments (or liners) are made of formed and welded sheet steel and then covered with porcelain. This operation takes place in a separate vitreous plant located nearby. After the sides, tops and bottoms leave the presses, they are placed on skids and moved to the electronic welding machines. A roller conveyor flanks this line on one side and carries the finish welded liners away to the cleaning section. A monorail hoist spanning this area is used to lift the welding fixtures into the machines.

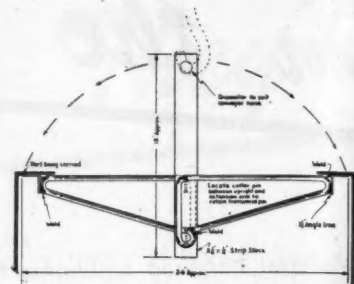
During cleaning (before the porcelain finish is applied) the compartments are dipped automatically into the various cleansing solutions by cam-lifting sections incorporated into the monorail chain guide channel. The swiveled brackets which support the compartments raise, permitting the part suspended to be lifted simultaneously from one tank and deposited in the succeeding tank as it proceeds along the route.

The spraying and baking operations which follow are also aided by a monorail system which transports the liners. Once the finish is baked, the liners feed through an inspection section, where any necessary retouching is performed. They are then placed on a slat conveyor, spaced with rubber pads, which carries the liners to a belt conveyor running to the assembly plant. An idea of the magnitude of the operation can be gained from the following fact. The vitreous and assembly plants are separated by hundreds of feet, and the conveyor system, installed in a covered trestle, bridges the entire distance.

#### Tree-Shaped Layout

As P. J. Backman, general plant superintendent, put it, "Our lay-

out is designed like a huge tree. The trunk is the main assembly line and the branches are formed by the sub-assembled parts flowing in from each side. The outside-supplied



Spreader bar adapter to hold cabinet shells during spray painting.

parts are fed in from one side, and our own fabricated parts from the other."

As the liners (food compartments) arrive on the assembly floor, they are removed from the belt conveyor and temporarily stored on wooden pallets placed on sections of wheel conveyor, which feed to the assembly line. Placed at right angles at each end of these sections are ball roller sections which permit the skids to be moved sideways and longitudinally to the wheel conveyors.

#### Unit Stacked in Racks

The freezing unit for the refrigerators, supplied by another Westinghouse plant, arrive in special railroad cars. These cars have upright steel channels extending from the floor to the roof, with heavy hooks mounted to them at intervals of 18 inches. The units are made with metal strip around the outside punched with holes, which permits suspending them horizontally between the channels during shipment. The channels which are located at either side of the car door openings have a set of hooks also on the outside. These are used to hold the units which are loaded lengthwise to the car between the doors, while the other units are loaded crosswise to the car. (See photos in "Off the Shipping platform" department, this issue.)

In unloading, the units are hung on a monorail line. This carries them to the second floor where they are stored in steel racks. These

(Turn to page 54)



*Announcing . . .*

# THE FIRST MATERIAL HANDLING EXPOSITION

*for January, 1947*

**M**ATERIAL handling engineers, executives, purchasing agents—everyone concerned with material handling—will be interested to know that plans for the first National Material Handling Exposition are well under way. The scene will be Cleveland's Public Auditorium, on January 14 to 17, 1947.

## IT WILL BE YOUR SHOW

Thus, the Material Handling Industry is coming into its own with a national exposition of its own. Up to now, material handling displays have appeared merely as "side shows" in exhibits devoted to different types of industries. This newly announced exhibition will be exclusively *your show*, featuring the whole gamut of material handling equipment, presenting the latest ideas for those whose primary interest is in modern space-saving, dollar-saving, labor-saving ideas.

The Exposition management is composed of men who have grown up with the industry, who have seen it develop from a weak beginning to a state of primary importance in all industry. Their efforts have contributed to its growth over the years—the same faith is behind the First Material Handling Exposition.

## PRESS-TIME FLASH

As we go to press we learn that space reservations have been made early by many material handling companies. The listing received just before press-time includes:

Automatic Transportation Co., Chicago, Ill.; Towmotor, Cleveland, Ohio; Clark Equipment Co., Battle Creek, Mich.; Barrett-Cravens Co., Chicago, Ill.; Silent Hoist Winch & Crane Co., Brooklyn, New York; Acme Steel Co., Chicago, Ill.; Electric Products Co., Cleveland, Ohio; Economy Engineering Co., Chicago, Ill.; Lewis-Shepard Products, Inc., Watertown, Mass.; Rack Engineering Co., Pittsburgh, Pa.; American Engineering Co., Philadelphia, Pa.; Yard-Man, Inc., Jackson, Mich.; The Bassick Co., Bridgeport, Conn.; Lamson Corporation, Syracuse, New York; G. B. Lewis Co., Watertown, Wisconsin; Marsh Stencil Machine Co., Belleville, Illinois; Lyon-Raymond Corp., Greene, New York; National Metal Edge Box Co., Philadelphia, Pa.

Remember the dates and the place—January 14 to 17 in the Public Auditorium, Cleveland. FLOW will keep its readers up to date on all Exposition developments as rapidly as information becomes available.



Program Committee Chairman  
Ezra W. Clark,  
Clark Equipment Co.

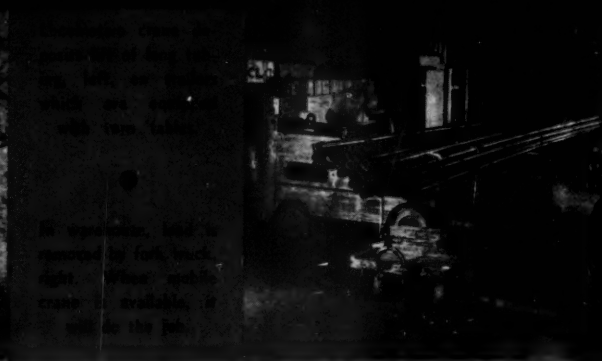


Program Committee Member  
Elmer F. Twyman,  
Automatic Transportation Co.



Program Committee Member  
Edwin J. Heimer,  
Barret-Cravens Co.

Here are the members of the Program Committee: Chairman Ezra W. Clark, Vice President and General Manager, Clark Equipment Company; Sherry Huss, Director of Operations, Acme Steel Co.; E. F. Twyman, General Manager, Automatic Transportation Co.; Edwin J. Heimer, President, Barret-Cravens Company; Ralph D. Mount, Advertising Manager, The Bassick Co.; E. W. McDonald, President, Economy Engineering Co.; Gordon J. Berry, Vice President, Electric Products Co.; Irving B. Hexter, Publisher, Flow Magazine; A. L. Lewis, President, Lewis Shepard Co.; Norman L. Cahners, President, Materials Handling Laboratories; Richard Rimbach, Materials Publishing Co.; Earl I. Burke, Republic Steel Corp. (Cleveland); J. F. Thomas, President, Thomas Truck and Caster Co.; Jervis B. Webb, President, Jervis B. Webb Company. The members are now hard at work developing a program that will be second to none.



By M. J. TANZER  
Assistant General Manager  
The Cleveland Stevedore Company  
Cleveland, Ohio

*This stevedoring and warehousing operation illustrates the flexibility of standard equipment, which is used in handling an extremely diversified range of commodities—"anything from a parcel post package to a locomotive".*

# The Flexibility of

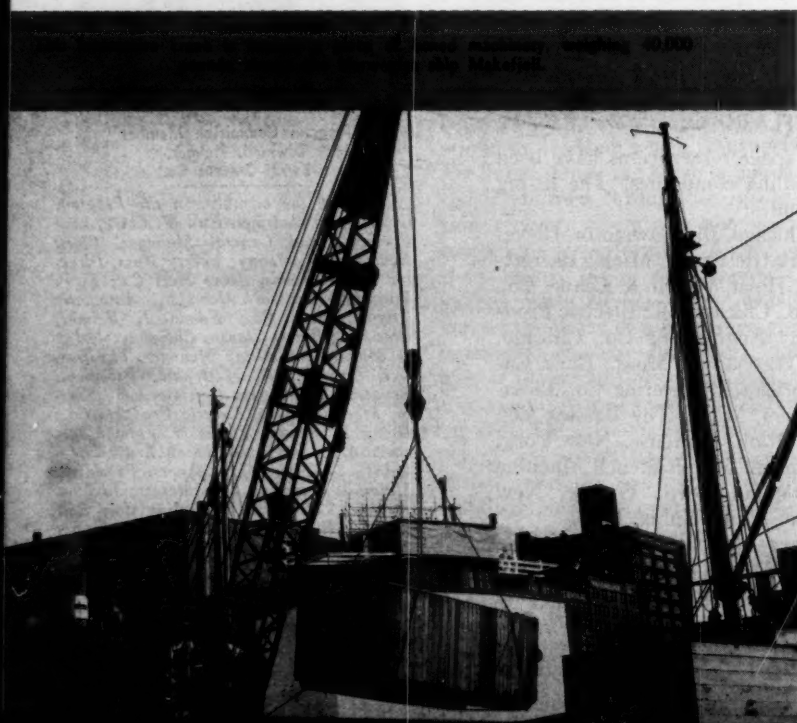
THE Cleveland Stevedore Company operates docks, marine terminals, inland merchandise storage warehouses, and also processes commodities for long-term storage and export shipping. Our company maintains over 1,000,000 square feet of outdoor ground storage space, and more than 300,000 square feet of indoor storage space. These facilities are in six locations. The dockside storage, open as well as closed, is in the Greater Cleveland harbor district, where both

Great Lakes and ocean-going vessels are stevedored. The inside operations described in this article apply chiefly to our main inland merchandise storage warehouse, where all control and scheduling operations take place. Both outside and inside handling operations are completely mechanized, and the pallet unit load method is used wherever feasible.

As a general merchandise warehousing and stevedoring operation, our company naturally handles a wide diversity of commodities. These may include anything from cases of electric light bulbs to machine parts weighing 40 tons or more. A sizable volume of bulk materials is also received and shipped. While the variety of products handled is considerable, we are using standard material handling equipment for all lifting and transporting tasks. By use of certain accessories, as well as coordination of various types of equipment, we obtain the flexibility necessary for economical and speedy handling of material in quantity.

## Locomotive Cranes Do Varied Tasks

Units of our fleet of locomotive cranes range up to 40-ton capacity, with booms extending up to 75 feet in length. They perform a variety of handling jobs in connection with stevedoring, rail and truck shipments, and outside storage operations. In a number of instances



they are also coordinated with inside handling equipment.

Here's a typical example. We receive carloads of bundled small-diameter steel tubing for storage in one of our dockside warehouses. A locomotive crane unloads the car and deposits the lifts onto a two-trailer tractor-train, which is then hauled by industrial tractor into the nearby warehouse. Here, the lifts may be removed from the trailers by either of two methods,

necessity of changing it frequently.

We also handle a sizable volume of sheet steel and heavy boxed material (in our outdoor storage space adjoining our main inland warehouse). In this operation an adjustable grab gear is used.

Periodically we also receive (at our dockside locations) ship loads of such bulk material as flux stone, coal, and sulphur. Stock-piles of some of these materials are built by self-unloading ships on our docks

adjacent to the railroad tracks. By use of clamshell buckets our cranes later load these materials into open-top cars. One dock area, incidentally, is set aside for handling steel and other metal scrap, an operation in which the cranes perform equally efficiently by use of electric lifting magnets. Usually this scrap material arrives by boat or car. It is then sorted and later reloaded into gondola cars.

When bulk materials arrive by

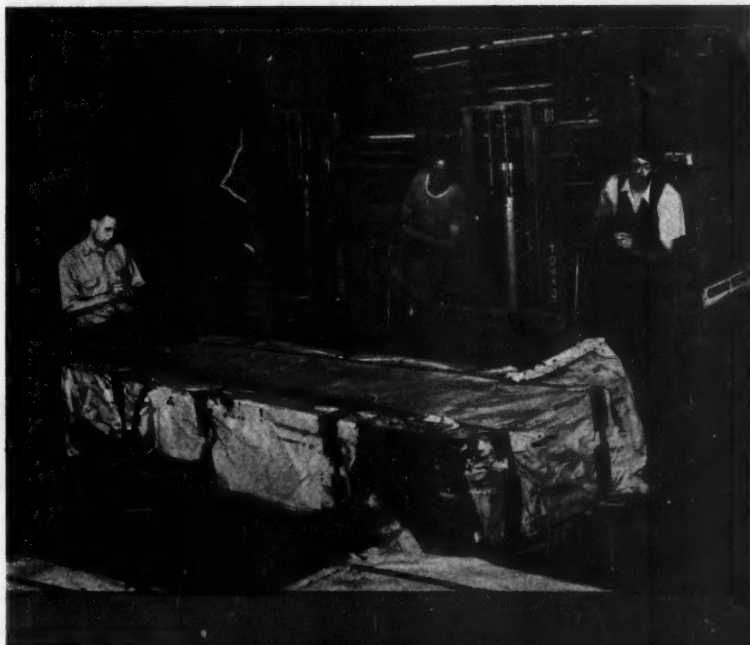
# ty of Standard Equipment

depending on the availability of equipment.

A fork truck may be used. It picks off the tubes from the trailers and deposits them on the pile, where the individual lifts are separated by dunnage for subsequent power handling. Or the stacking operation may be performed by our 10,000-pound capacity mobile crane, which is used for a variety of tasks within our warehouses.

Note that these trailers are equipped with turntables, as shown in the accompanying photos. This arrangement keeps the long lengths of tubing (20 to 30 feet) aligned with the direction of travel on turns, eliminating the necessity of excessively large areas for a turning radius.

Another feature in connection with the locomotive cranes is the double sling gear used for lifting long lengths of bar stock, tubing, etc. These spreaders also provide three-point suspension by use of a center-support sling (when exceptionally long pieces are handled). This eliminates bulging of the lifted loads and contributes to safe handling. The spreader is made from pieces of heavy triangular steel plate, reinforced top and bottom with channel irons. Holes are drilled at intervals across the lower channel to accommodate shackle bolts at various distances according to the length of the material being handled. This makes the gear readily adaptable to material of various lengths, thus eliminating the



Two 6,000-pound fork trucks are coordinated in moving and lifting steel package consisting of four lifts, above.

Irregularly shaped cartons containing fragile materials. Goods are protected by the pallet frame.





ships which have no self-unloading gear, our cranes perform the discharging operations by use of clam-shell buckets. In such cases, some stevedoring companies find, the "scooping up" of the material in the far corners of the hold toward the end of the operation frequently presents a problem—one that is accompanied by much sweeping and similar time-consuming manual work. We avoid this by lowering into the hold a small bulldozer, whose blade within a relatively short time shoves the remaining quantities within reach of the buckets. This method saves many hours of "in port" time.

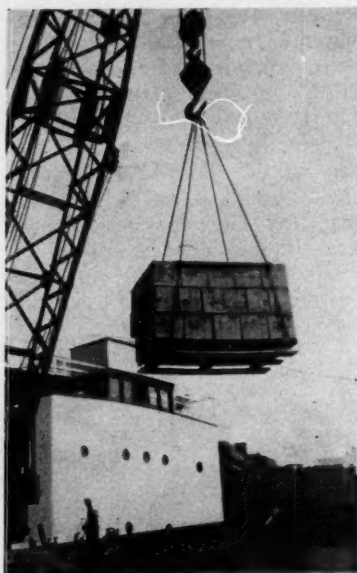
The flexibility of our locomotive cranes is also evident in other boat handling operations. Here's an example. Recently we loaded crated railroad locomotive parts on a foreign ship. Some of the pieces exceeded the lifting capacity of our individual cranes. Consequently we synchronized two cranes, resulting in a combined capacity adequate for the heaviest lifts.

Occasionally a single crane may be employed in heavy-duty tasks where the weights closely approach the capacity of the machine. In such cases we simply use outriggers. These give the machines the necessary rigidity, permitting heavy tasks to be performed with complete safety.

### Outside and Inside Handling

Our cranes may also be used in handling operations in which other inside equipment is coordinated. An example are lifts of 10,000 pounds or more to be unloaded from open-top cars for inside storage in our main warehouse. These items are usually skidded or boxed machinery. The locomotive crane

will deposit the load from the open-top cars on the warehouse plat-



How ships are loaded, unloaded by special gear: Note angle iron braces which keep the loads rigid.

form. The material is placed on rollers and then hauled by industrial tractor to the nearby storage area. Or another method may be used if the load does not exceed 10,000 pounds. It may be picked up by our mobile crane and transported to the storage location.

A third alternative in such a case is to synchronize two of our 6,000-pound capacity fork trucks. In this operation, the specific handling is determined by the dimensions of the load. If the length of the box does not exceed 10 feet, the two fork trucks will work side by side, raising the load and traveling with it in unison. If the material is rather long—sometimes the length of such units may be 24 feet—the two trucks will pick up the load

from the two ends, with the operators facing each other. In this case they will of course travel with the load in a longitudinal position. Usually the better truck operator will be in the lead, with the second operator watching him and following his moves. However, if such a long piece is to be moved only a short distance in a wide space without aisles, the two fork trucks will also work side by side, each picking up the load several feet from the ends in order to avoid sagging.

The success of stevedoring naturally depends on short "port time" of the ships being handled—demurrage on vessels can be an extremely costly item. This phase ties in with pallet unit load handling, an operation in which our cranes also play an important part. To meet both our stevedoring and warehousing handling requirements, we use a 48"x48" stevedore type pallet, which has a 3½-inch overcut on each side. This makes the pallets adaptable for handling both by cranes and fork trucks, in ship loading, discharging or warehousing operations. For crane handling, the sling or spreader bar is simply inserted between the overcut of the top and lower pallet decks.

When we have a ship load of packaged cargo, the material is palletized in the hold and the loads are deposited on the dockside by crane. From here the palletized units are moved either by fork truck or tractor-train (depending on the distance of the haul) to the dockside warehouse. When the space within the ship permits, the crane will hoist a fork truck aboard for maximum speed and convenience in spotting the palletized loads for crane handling. In loading a ship, the operation would naturally be reversed.

Thus, either by themselves or in conjunction with other powered equipment, our locomotive cranes perform many and varied handling tasks, providing the flexibility necessary for handling practically "anything from a parcel post package to a railroad locomotive". Flexibility of operations is similarly maintained in our inside operations, so that material is moved in quantity and with minimum handling between receiving, storage and shipping operations. The details

(Turn to page 46)

In inland warehouse, tractor-train moves load to shipping location. Modern handling is the keynote. Note that trailer-train is already on the move.



*The Judge says -*



# 60 DAYS! FREE TRIAL

without Penalty  
or Obligation  
if you've been  
**GUILTY**



*of NOT Using the*

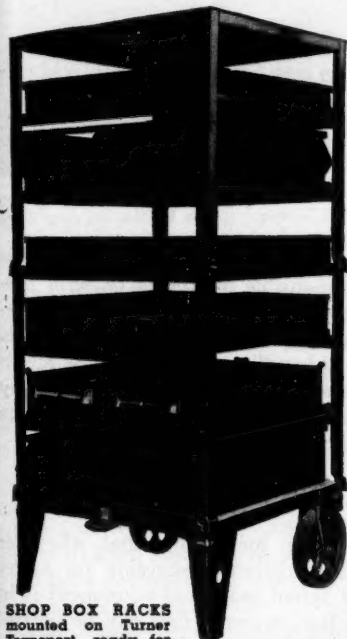
## TURNER SYSTEM OF MATERIALS HANDLING

For shame! Without the TURNER SYSTEM you have failed to utilize a method which has saved up to 50% in Labor Cost, Floor Space and Equipment Cost for hundreds of leading manufacturers.

We are so sure that you can benefit as well from the use of this system that we are willing to ship an assortment of standard units for 60 DAYS FREE TRIAL. Use them for at least two months. Keep them if (in your opinion) they save labor, time, and space. Return them if they don't. There is absolutely no obligation, except that you assume nominal transportation charges.

The complete system is outlined in a twenty-page book which is sent to you without charge.

**WRITE ON YOUR LETTERHEAD FOR YOUR COPY OF THE TURNER SYSTEM BOOK.**



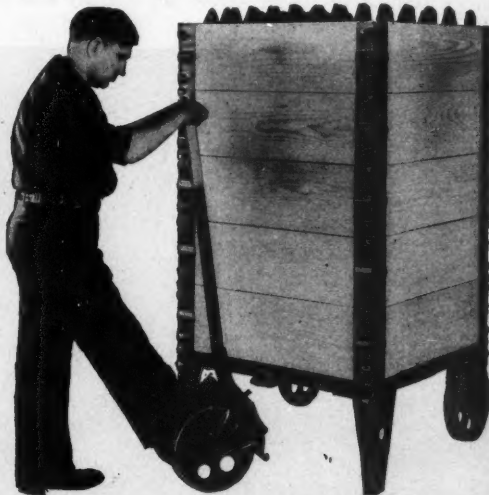
**SHOP BOX RACKS**  
mounted on Turner  
Transport, ready for  
instant removal to any  
part of the shop.



**FLOOR PLATE DECK TRANSPORT**  
provides point contact with hot  
materials. Non-skid embossments  
hold materials on deck.



**WHEELING SHOP BOX** carries other loaded SHOP BOXES.



The square Transport is the foundational unit of the Turner System. It can be moved in restricted space by the hand Jimmy, power lift truck, crane or conveyor. Steel or Wood Blis Sections or Section Trays lock one on another on the Transport for vertical expansion.

# FACTORY SERVICE COMPANY

4607 NORTH TWENTY-FIRST STREET  
MILWAUKEE 9, WISCONSIN

Backward Handling Stunts Plant Growth, Hence You Need

# Sound Handling For Sound Expansion

*From a humble beginning in a bicycle shop almost 50 years ago, this modern plant has grown into one of the country's leading producers of dental office equipment. Expansion, tempered with good judgment, has been aided by the use of advanced material handling methods.*

WHEN Henry Weber first began producing glass cuspidors with water constantly flowing inside them for dentists' offices, he probably did not have any idea that he would eventually revolutionize not only the operating efficiency in dental procedure, but also in the end change the entire appearance of the dentists' office.

The Weber Dental Manufacturing Company, Canton, Ohio, produces the three major office fix-

tures which are used by the dental profession: the chair, the unit (which is the device holding the instrument tray, syringes, engine cuspidor, etc.), and the X-ray equipment. These items may be produced either in mass or small quantities, according to the trend in one or another style. During World War II, the company made many of the dental equipment series which were used both by the army and navy. The high produc-

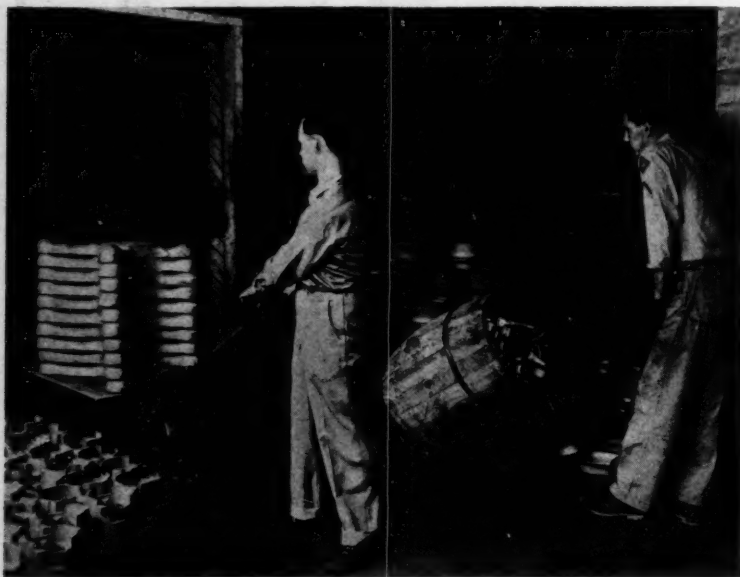
tion which was necessary then was responsible for the increase in personnel and tooling, which also demanded modern and better material handling methods. These methods are being bettered every day as production increases over the peak of the last war.

## Job Shop Flow

Shop men know that wherever intermittent production on many different models of equipment is in effect, material flow can be bottlenecked when efficient handling is lacking.

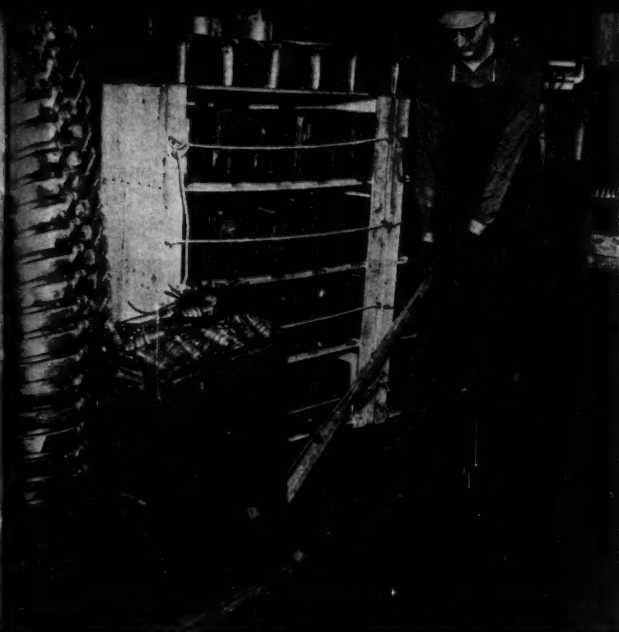
This company has endeavored to use equipment which is suitable for the many different parts being manufactured. In an accompanying photo two types of manually operated handling devices are shown. The one, a barrel dolly, is particularly effective for moving barrels of material which is machined outside the plant. The other device is a powered jack skid lifter which is used to move skid loads of material in process. This piece of equipment is designed for moving material through various processing points.

The raw storage room which contains material received from the foundry to be machined, is located next to the receiving platform at the far end of the plant. Material is stored in this area in one of three ways. Bar stock (steel, brass,



Operator at left using hand truck to move skid of X-ray bases. Man at right moving barrel with special three-wheel hand truck. Note handle clip which holds barrel in position during movement.





Tote pans being moved on hand truck with bed of rollers. Seat frames are stacked on four-castered dollies at left. Note rope used to retain parts in trucks in the foreground.



Operator in plating room loading cellophane bags with plate nuts. Operators to the rear are dipping parts and removing them from the wire holders.

etc.) is placed on end in vertically partitioned racks. This saves much needed floor space, and still permits quick selection of a particular size when needed. Castings are stored either on skids or in tiered bins, depending upon the size and shape.

Other materials which are processed outside the plant are placed into finished stores upon arrival to be later requisitioned into production. As shown in the flow diagram, the central portion of the layout is devoted to the machine shop. The grinding room and plating section are located on one side of the machine shop while the painting, finished material stores, and assembly sections flank the opposite side.

#### Castered Equipment, Tote Pan Handling

The dentist's chair (most of us have sat in one) is a complicated mechanism which is designed to be not only very flexible in operation, but also rigid in any of a number of positions in which it can be maneuvered.

The back, the seat frame, and the jack assembly (base elevating section) are the main structural portions of the chair. The arm rests, floor plate, control levers, head rest, and leg and foot support members are other smaller items

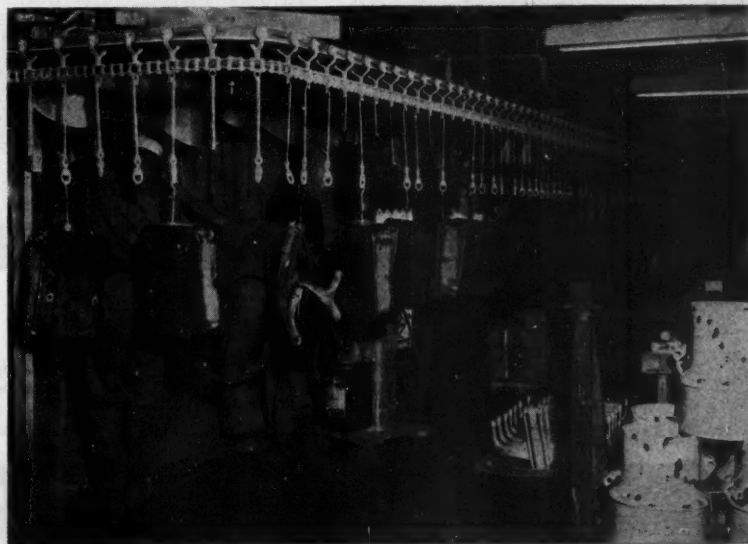
which make the complete assembly. Most of these parts are castings (iron or aluminum) which must have some machining performed on them before assembly.

The large parts are moved through the machining section in four-castered hand trucks or on low dollies which are designed to hold the widest and longest bases of the large items. As shown in one of the photos, the seat frames are stacked on a dolly, and because of their shape can be nested to re-

tain them in an upright position.

The smaller parts are usually handled in either tote pans or castered skid bins. The tote pans used are interesting particularly from a stacking standpoint. Five sizes are used in this section. The smallest (about 8 inches long and 4 inches in width and depth) is used for tiny screws, special bolts, nuts, and other miscellaneous small parts. Two of these can be placed side by side crosswise on top of the next size pan, which has a nar-

Monorail conveyor in painting room passing from spray booth to infrared dryer. Hand trucks are shown for both painted and unpainted parts.



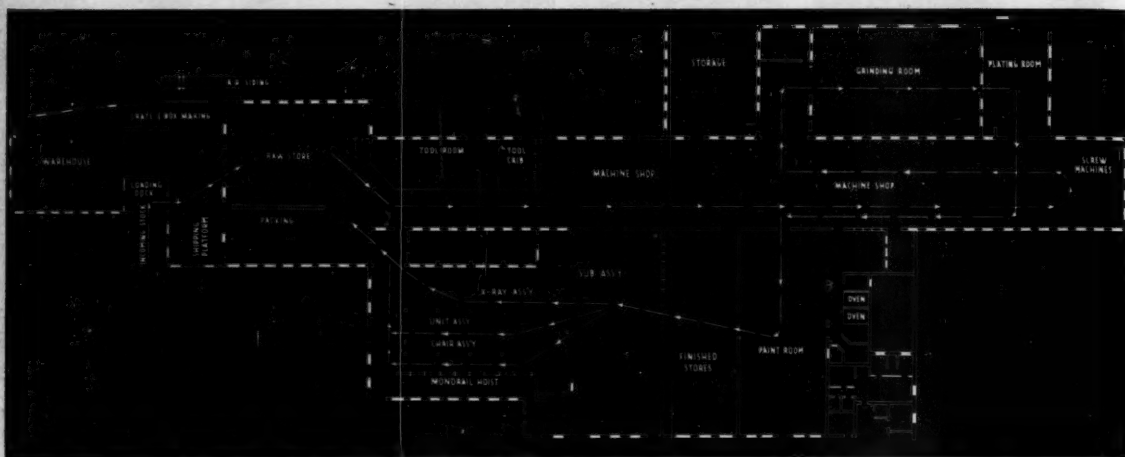
row grooved edge slightly wider and longer than its sides. This also permits a tote pan of the same dimension to be placed on top of it without slipping off.

Each succeeding size of tote pans

required, small hand trucks are used which have a base made up of a 2-inch roller conveyor section with a long handle attached at one end (see photo). An 18-inch steel arm with a hook at one end is

### Handling Through Grinding and Plating

Before any plating operations can be performed on cast parts, a routine grinding process must be



Flow sheet of dental chairs, units, and X-ray.

can be nested in like manner. This method of handling is highly desirable in a machine shop where varying quantities and sizes of parts are processed on the same machine.

Because of the quantity of tote

swiveled to this handle, which can be caught on the near end of the tote pans, and the whole unit is tilted toward the operator. This elevates the front end and the truck can be pushed over the floor.

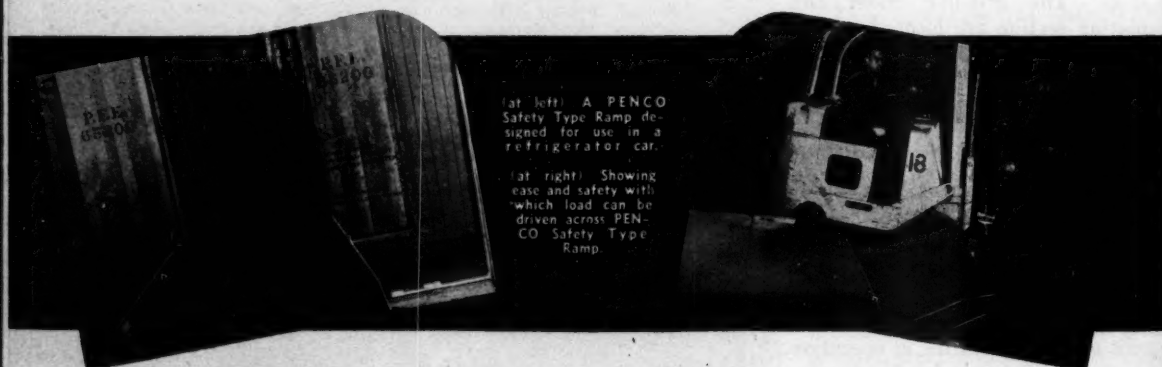
followed. This operation is tedious, because it must be done by hand due to the contours and offsets present on the parts. To permit the operators to remain at their

(Turn to page 48)

## BRIDGE THE GAP WITH PENCO

### Safety Type Bridge Ramps

PATENT PENDING



#### SAFE AND EFFICIENT

Investigate the outstanding advantages of this ramp which has beveled edges for easy entry, is crowned for different car and dock levels and has non-skid diamond safety plate surface. Side guards and full range, positive locking device insure safety.

#### ONE MAN OPERATION

The **PENCO** ramp is easily transported, easily placed in position and locked and easily removed. Write us for descriptive bulletin 461.

## PALLET ENGINEERING COMPANY

625 Second St. • San Francisco 7, California

# USE BATTERY TRUCKS

for most efficient

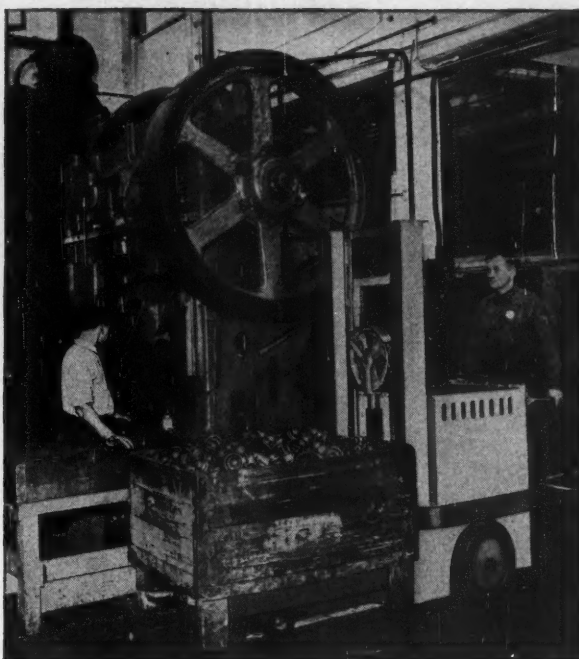
STOP-and-GO handling



## *In Industrial Trucks, Alkaline Batteries Give You These Important Advantages*

- They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They can be **charged rapidly**; gassing cannot dislodge the active materials.
- They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- They are **foolproof electrically**; are not injured by short circuiting, reverse charging or similar accidents.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain**.

**Edison**  
ALKALINE BATTERIES



## ... ALKALINE BATTERIES for most economical power

In moving materials to and from a production machine, an industrial truck will usually make 14 or more moves forward, backward, up and down. A battery-powered industrial truck has natural advantages in this and other stop-and-go handling services because of its superior maneuverability, high availability and extremely dependable operation. It gets the necessary surges of power instantly from its battery, yet consumes no power during stops. Thus it not only uses power with high efficiency but the current used for charging its batteries is the lowest-cost power available.

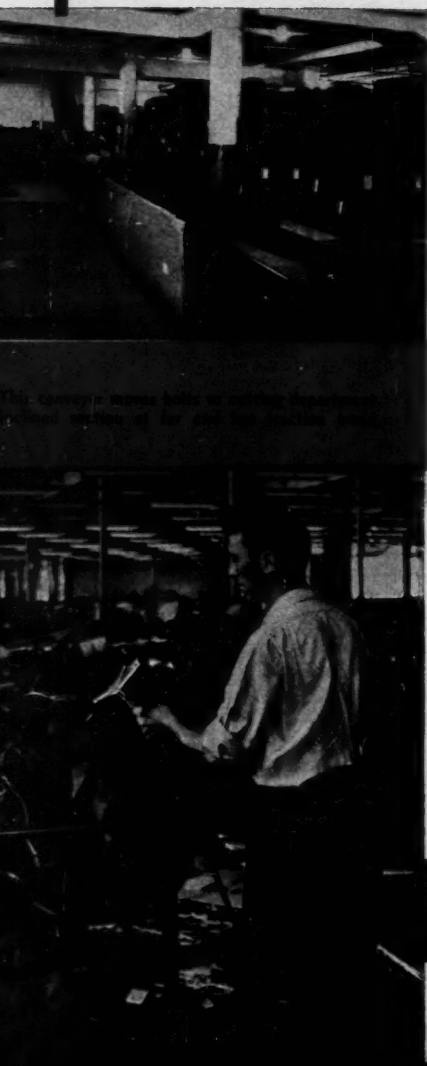
Its electric-motor drives for traction and lifting, operate quietly, without vibration, and with almost negligible repair requirements. With batteries exchanged two or three times per 24-hour day, the truck is continuously supplied with power. So except for the few minutes needed to exchange batteries, the truck need not stop work for servicing of its power unit.

For stop-and-go material-handling work, therefore, a battery industrial truck is an inherently dependable and economical machine... especially when powered by Edison Alkaline batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof electrochemical principle of operation, they are the longest-lived, most durable, and most trouble-free of all batteries. Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey. In Canada: International Equipment Company, Limited, Montreal and Toronto.





Load on each flat truck is a "lot"; powerhandled skid v  
Left: Racks used in sponging department for drying of  
to woolen room.



**M**EN'S garment manufacturers estimate that the production for the current year will be about 22,000,000 suits and coats. The Joseph and Feiss Company, Cleveland, is one of the country's largest producers of men's clothing. Having within recent months completed its part of the tremendous job of clothing the navy, it is today busy making its share of the national output in men's civilian wear. This company represents a good example of modern handling practices in the men's needle trades industry. The suits and coats manufactured by it are sold by independent dealers throughout the country under the trade name "Clothcraft".

There are several reasons why Joseph and Feiss is a representative company in its field. It has maintained its leading position in the industry for over 100 years. This is inevitably an indication of sound management methods, which in turn are also reflected in up-to-date material handling practices. It is the world's largest producer of men's clothing operating on one floor. The main building is of one-

## "Tailor-T HANDL

*Manual material handling equipment i  
aid to production in the plant of this  
manufacturer. Several types of hand t  
skids, in conjunction with other equipm  
an efficient operat*

floor construction, with a basement. (A smaller multi-story building, adjoining the main plant, serves for finished stock storage.) The main work shop, or factory, is located in one immense room which comprises 260,000 square feet of floor space—a layout feature designed in accordance with efficient flow principles. The accompanying diagram shows the main lines of flow in this huge room. The basement section, on the ground floor level, houses all service functions as well as the receiving and shipping departments. The company normally employs about 2,500 people.

Workers are using transporting table at work. Lower deck of the table is used for small bundles.



A power-handled skid with end racks is used for large lots. The unit is then moved to woolen room.

# er-Made" DLING

g equipment is proving its value as an plant of this leading men's garment types of hand trucks, racks, dollies and other equipment, are contributing to efficient operation.

From the viewpoint of material handling, these facts stand out: 1. Adequate handling facilities are provided for every type of job, either by freight car or truck and measure up to 58 inches in length. 2. Wherever feasible, material is moved in sizable units and single bolt handling is avoided. 3. Specific devices enable operators to move material with least effort and minimum handling. 4. Layout provisions eliminate back-tracking, keeping the material advancing in an orderly progression once it has entered the processing or manufacturing cycle.

## The "Lot" is the Unit

The woolens arrive in bolt form. Incidentally, the railroad loading dock and the truck platform join at the southwest end of the building, with large roll-up metal doors in each section. This arrangement provides a compact receiving-shipping department.

At the receiving point the woolens are segregated according to lots by use of four-wheel hand trucks. This breakdown is a cardinal point in handling and record keeping. For example, if 1,000 bolts arrive they cannot be put through processing like so many uniform pieces, without regard to color or finish of the material. The bolts from every mill—and those of different color from the same mill—are therefore segregated as to shade, pattern, etc., each unit constituting a lot. Since these lots frequently do not exceed 15 to 20 bolts, the four-wheel hand trucks are well suited to this type of handling. This is particularly true since the moves to the subsequent stations are short.

The procedure is changed when large lots arrive which may each contain upward of 30 or 40 bolts



Neat, well-equipped packing stations. Castored tables move orders from folding to the packers.



This unusual press, described in article, holds the woolen fabric when garments lodge in the box.



Heavy bar is then strapped while on dolly, which is shown in the front of the machine.

# Get the benefits of MOTOR-GENERATOR BATTERY CHARGING

for your  
INDUSTRIAL and  
LIFT TRUCKS



BATTERY CHARGERS

*Fully  
Automatic*

• Completely automatic, Hertner Motor-Generator Battery Chargers save current and protect batteries against damage. Batteries may remain in trucks while being charged or may be individually charged when removed from truck. It is not necessary for anyone to remain in attendance when a Hertner charger is in operation. Hertner Motor-Generator Battery Chargers are designed for specific jobs:

## TYPE "H" CHARGERS

for Lift-Truck Batteries

## TYPE "K" CHARGERS

for other Electric Industrial Truck Batteries

• Both chargers are available in single-circuit units for charging one battery, and in multiple-circuit units (for charging two or more batteries simultaneously). They are furnished in standard units to fully charge lead-acid batteries in 8 hours and nickel-alkaline batteries in 7 hours.

Overcharging is impossible with these units, because the charging of individual batteries is governed by completely automatic controls which cut off each battery when it reaches full charge.

In case of current failure, the generator shuts off automatically, and when power is restored the motor-generator automatically restarts and charging is resumed.

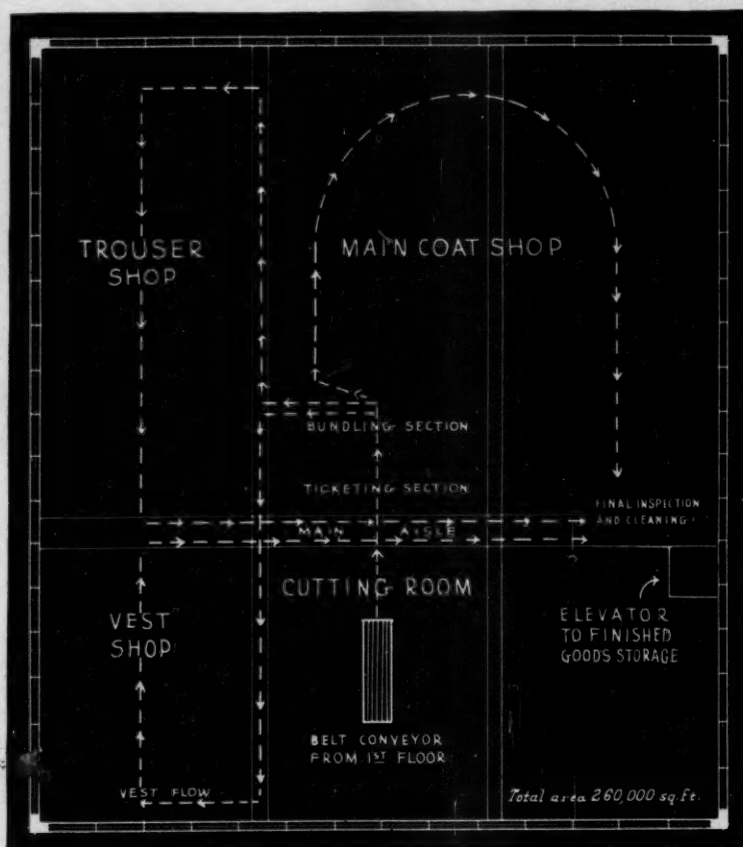
Tell us your charging requirements and we will gladly send Bulletins and complete information describing the Hertner Chargers that fit your needs.

## The HERTNER Electric Co.

A General Precision Equipment Corporation Subsidiary  
Motors • Motor Generators • Generator Sets  
12756 Elmwood Avenue, Cleveland 11, Ohio  
Representatives in principal cities throughout the world

each. These are segregated on skids equipped with end racks, which are then moved by powered platform

have wheel support in the center and a caster each fore and aft. These loads are readily pushed be-



Flow sheet of main shops in large factory room.

trucks. (Trimings or accessories are usually received in cases, which are transferred on two-wheel hand trucks to the nearby storage area.)

After the bolts of cloth have been checked in, the inspection and sponging department is the next stop. The cloth is mechanically unwound for the examining operation. It is now in flat folds which have been deposited on skids. To prevent snagging the material, the tops of these skids are smoothly finished and varnished. One skid load may contain up to 24 bolts of cloth (about 1,500 pounds). The short move of about 25 feet to the examining station is accomplished by use of hand lift trucks.

The transfer of goods from the unwinding machine to inspection is facilitated by the use of live skids. Thus if the hand trucks are used elsewhere in the department, there is no excuse for carrying single bolts from the unwinder to the inspection tables. These live skids

between the two points concerned, relieving the hand trucks.

After the material has been scrutinized for possible flaws by the examiners, it is again advanced in sizable skid loads—this time to the sponging or shrinking machines. From here the cloth again emerges in roll form. The rolls are now put up to dry on racks, which are shown in one of the photos. These portable units are about seven feet high, 6 feet long, and 50 inches wide at the base, tapering slightly toward the top. The outside surface of the uprights is equipped with narrowly spaced hooks, on which the shafted rolls are hung. Rungs within the framework give the units added capacity, and a rack may hold as many as 15 individual bolts at one time.

## Ready for Manufacturing

The rack-loads of shrunken woollens are transported by pow-



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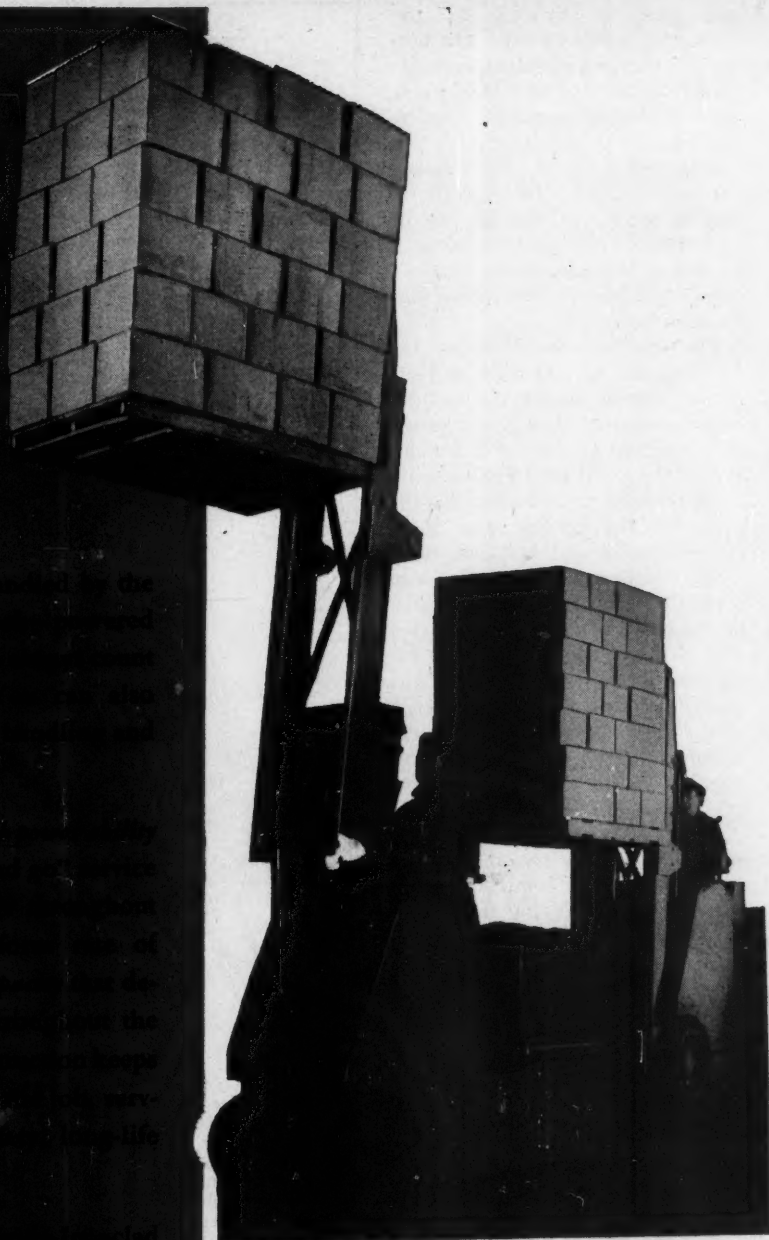
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# EXIDE-IRONCLAD POWER MEANS ALL-DAY-LONG POWER



## DEPENDABLE POWER



SEPTEMBER, 1946



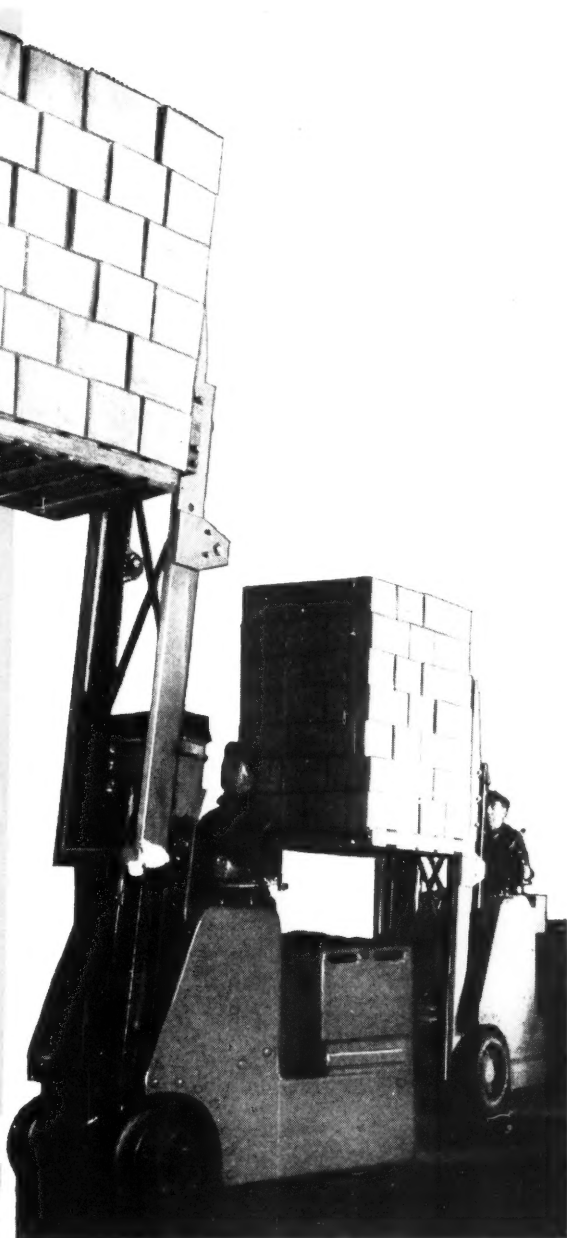
# EXIDE-IRONCLAD POWER MEANS ALL-DAY-LONG POWER

When your materials are handled by the efficient electric industrial truck—powered by Exide-Ironclads—you can always count on full shift availability. You can also count on faster, safer, easier handling and at a lower cost.

Exide-Ironclads have the *high power ability* needed for frequent "stop and go" service ... a *high maintained voltage* throughout discharge, assuring a uniform rate of operations ... and a *high capacity* that delivers peak performance throughout the shift. And their rugged construction keeps Exide-Ironclads steadily on the job, serving with dependability, safety, long-life and ease of maintenance.

Write us for a FREE copy of Exide-Ironclad TOPICS which contains "Case Studies" of materials handling problems. Tells how to cut handling costs up to 50% ... covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY CO.  
Philadelphia 32  
*Exide Batteries of Canada, Limited, Toronto*



## DEPENDABLE POWER





ered platform truck to the (sponged) woolen room. (In normal times, a reserve stock is maintained in a separate stockroom, where the woolens are stored before shrinking.) As the material enters the woolen room, a card is made out for each lot. This record indicates when the lots are to be routed to the cutting department, a section of the main work shop located on the floor above. (See flow diagram.)

The woolen room is about 150 feet long and 60 feet wide, and situated directly under the cutting department—another layout provision designed to deliver the material to the point of use with minimum handling. Installed in the center of the woolen room is an endless rubberized belt conveyor, which inclines at the far end through the ceiling. The stockpiles of woolens are arranged on either side of the belt line, permitting the shortest possible moves from any point in the room to the conveyor. The lots are sent up on regular schedule to the cutting operation, the first step in the intricate mass-production of men's clothing.

It is noteworthy that this conveyor is of fairly recent origin in this 100-year-old company. "You have to keep changing to keep up to date." Previously, the sponged woolens were delivered to the cutting department by other means. In those days several storage locations were maintained in different parts of the basement area, and time was unnecessarily consumed in assembling and delivering the various lots to the cutters. However, when the belt line was installed it was possible to concentrate the various storage locations in this one room. Result: a compact layout that has saved considerable space, time and handling dollars.

#### The Bundle Becomes the Unit

To the person unfamiliar with garment trade practice the vast work shop may at first seem a great confusion of bundles lying about on scores of long tables and at hundreds of work stations. Consider that a man's three-piece suit may consist of as many as 50 different parts, then multiply that number by the thousands of garments passing through this shop every week.

#### LIFTING CLAMP

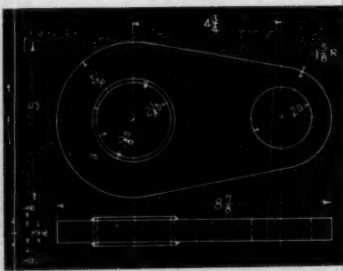
By JOHN H. THOMAS

Pittsburgh District Maintenance  
& Repair Dept.  
Westinghouse Electric Corporation  
Pittsburgh, Pa.

If you are handling heavy shafting or armatures, this special but simple clamp will make the job



easier. A  $\frac{3}{4}$ " thick piece of hot rolled steel (which can be burned from scrap ends of a larger plate) has two holes drilled or bored into it. The one for the shaft should be fitted with a brazed-in copper bushing to prevent damage. The bore of this hole should be about  $\frac{1}{8}$ " larger than the piece handled to give speed of operation.



The sizes shown in the drawing are for lifting shafts of  $2\frac{1}{4}$ " diameter, but the same proportions may be used for larger diameters. The photo illustrates an armature being lifted by overhead crane.

How are these many pieces identified so that the parts for each garment will be properly joined at the work stations? Obviously, a foolproof system of identification and control is necessary. Briefly, this control is provided by a system of numbered tickets, of which more presently. First let us consider certain aspects of the flow and method of routing.

As the bolts arrive from the basement woolen room—by lots—they are allocated to specific cutters. (Note that the cutting department is located in a strategic position in relation to the other departments.) The woolens are then laid up for cutting on long tables. As many as 40 layers of cloth may be cut at one time by high-speed electric knives. Each layer may represent from one to five complete garments. (Unlike a metal fabricating plant stamping out thousands of parts to be later assembled to *any* of other uniform subassemblies, here the component parts cut from each layer of cloth must be assembled to the correct parts from the same layer.)

The cut pieces now form the component parts, the subassemblies, of the garment to be. Here's why the pieces from each layer must be kept together and later sewn together. Every bolt of woolens belonging to the same lot may have microscopic differences in shading, though all bolts are of the same color. These minute differences would show up if the pieces from different bolts were sewn together.

After cutting, the component parts are tied with cords, securely held by metal clamps, and are then transferred to the ticketing section, adjacent to the cutting department. Each "cutting", by the way, now represents a "bundle", the unit in which the material will henceforth move through the shop. The original "lot", which may consist of enough bolts to make up to 200 suits, would now be too unwieldy a unit to be handled from station to station. Hence the breakdown to the "bundle", consisting of from eight to 15 garments, which can be readily handled.

The component parts reach the ticketing operators by use of double deck metal trucks. The large bundles are usually transported on

the upper decks, which are at a convenient level in relation to the table tops. Thus the bundles can be easily rolled onto the trucks and again rolled off at the receiving point, without stooping or lifting, and hence these trucks are well adapted to the handling requirements in the shop. Besides being of the proper working height, they are also readily maneuverable in the narrow aisles of the compact layout.

The ticketing operators stitch to each component part (of every garment) a ticket numbered according to a predetermined sequence. For example, the series 4930-1 will identify all parts cut from the first layer of a particular cutting. Continuing the series, 4930-2, 4930-3, etc., will identify each succeeding layer—and operators can join only the ones, twos, threes, etc., of each series, which is identified by the number before the dash. Thus strict order reigns in the seeming confusion, assuring that each component part of every garment will be joined with the other parts from the same layer, and thus match properly.

After ticketing, or identification, the parts, linings, and accessories are transferred to the adjoining bundling department (see flow diagram). Here all the items are assembled, then sent to the individual work stations or sections. This is done by checker boys on a twice-a-day schedule, who use the same double deck trucks for the transfer operation. It should be mentioned that a card travels with each bundle. This card (together with the ticket) indicates the quantity and working specifications, thus assuring that each operator will use the same color thread for the components of each garment. The card is also a guide to the location of the operation. The reason behind the company's adoption of the ticket-and-card system is this: it has slashed considerably the amount of record keeping, previously necessary with a different method and saved many hours of clerical work.

Thus the work flows from the cutting department successively to ticketing, bundling, then to the proper shop, such as for vests, trousers, or coats. The main line of

(Turn to page 48)



Time is money—save it by use of the CLARK Trucloade, newest of the Clark line of industrial haulage vehicles. Light, compact—yet sturdy as the famous Clipper, Carloader and Utilitruac. Let a Clark Field Engineer plan for you an efficient method of material handling—today!

Write for "Trucloade Broadside," it's free.

## LIFTS - CARRIES - TIERS

GAS OR ELECTRIC POWERED

Prices on CLARK products will not be advanced in excess of increased costs

## CLARK TRUCTRATOR

Division of CLARK EQUIPMENT COMPANY  
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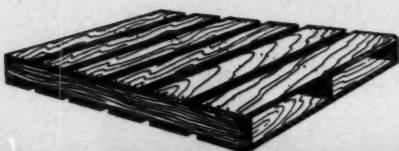
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ELECTRIC STEEL CASTINGS

ON THE



PALLET

## NEWS VIEWS TRENDS

**R**EVIEW and revision of the Wagner Labor Relations Act and kindred labor legislation "to the end of making all persons equal before the law" was recommended by the Southeastern Warehousemen's Association at its annual meeting in Jacksonville, Fla.

"The uncertainties and inequities of present labor laws and their method of administration and the apparent lack of control over certain radical elements in the labor field, combine to retard conversion and discourage needed expansion on the part of the warehousing industry in general. Existing uncertainties also prevent the production and enjoyment of many needed products and services," the warehousemen said in making their recommendation.

**A**LBERT RAMOND, of Albert Ramond and Associates, Inc., sounded a similar note in a recent address. "It is fundamentally necessary to convince labor that it will benefit, perhaps more than anyone else, from increased productivity, and that it's the relationship between wages and prices rather than the take-home pay that regulates material comforts," he explained. "It is equally necessary to show that increased productivity is the most sound, most permanent and most effective means of improving this relationship." He added: "It is doubtful that the current negative trends will be effectively corrected unless the workers and the public have a better understanding of these facts. There should be a vast educational program for the common good—movies, radios, the printed word—all should be mobilized to carry this economic truth upon which rests our whole economic life, perhaps our whole social structure."

**T**HE Forker Corporation, manufacturers of Ohio Tramrail Systems, Cleveland, has purchased a new factory with two acres in Cleveland as part of its expansion program. According to President J. Bentley Forker, the new site, in addition to providing better manufacturing facilities, will enable the company to expedite customer service.

**T**HE Island Equipment Corp., New York City, announces the purchase of an additional plant in Hollis, Long Island, adjacent to the company's Plant No. 1.

**A**N export program designed to make modern material handling equipment available to industry in nearly forty nations throughout the world has been activated by Automatic Transportation Company, Chicago, manufacturers of electrically propelled industrial trucks. The move is said to be in response to the demands of foreign manufacturers who previously

received Automatic equipment through the lend-lease program.

Modelled after Automatic's domestic sales organization, the export program will be conducted through independent sales representatives selected as exclusive Automatic distributors in each area. The program will be directed by C. M. Wynne, who has been appointed to head Automatic's export activities. He is assisted by Harold Acton, export sales manager, and Fenton Hall, factory export representative.

**T**HE nation's supplies of rubber—synthetic and natural—now appear adequate to maintain the rubber industry at its all-time record production for the full year, 1946, according to John L. Collyer, president of The B. F. Goodrich Company. Rubber manufacturing operations mounted 40 per cent higher during the first six months than in any prewar year and doubt had been expressed that there would be sufficient rubber to continue at that level throughout the balance of the year. It is now estimated that consumption of synthetic and natural rubbers in this country this year will approach 1,000,000 tons, over 70 per cent of which will be synthetics.

**I**N AN address before the Western Pennsylvania Safety Council, R. W. Mallick, Section Engineer of Westinghouse, stressed several important points which modern industrial plant layout should include. Mallick brought out that "For too many years, many supervisors and executives have been prone to place the blame for industrial accidents on carelessness. As a result of investigations and the compilation of statistics, we now know that many accidents have been due to faulty plant engineering and layout design. We have for years concerned ourselves with factors of structural and mechanical safety. In designing our plants and equipment, we have considered the utilitarian value, but in many instances we failed to recognize the adequacy of our designs from human safety."

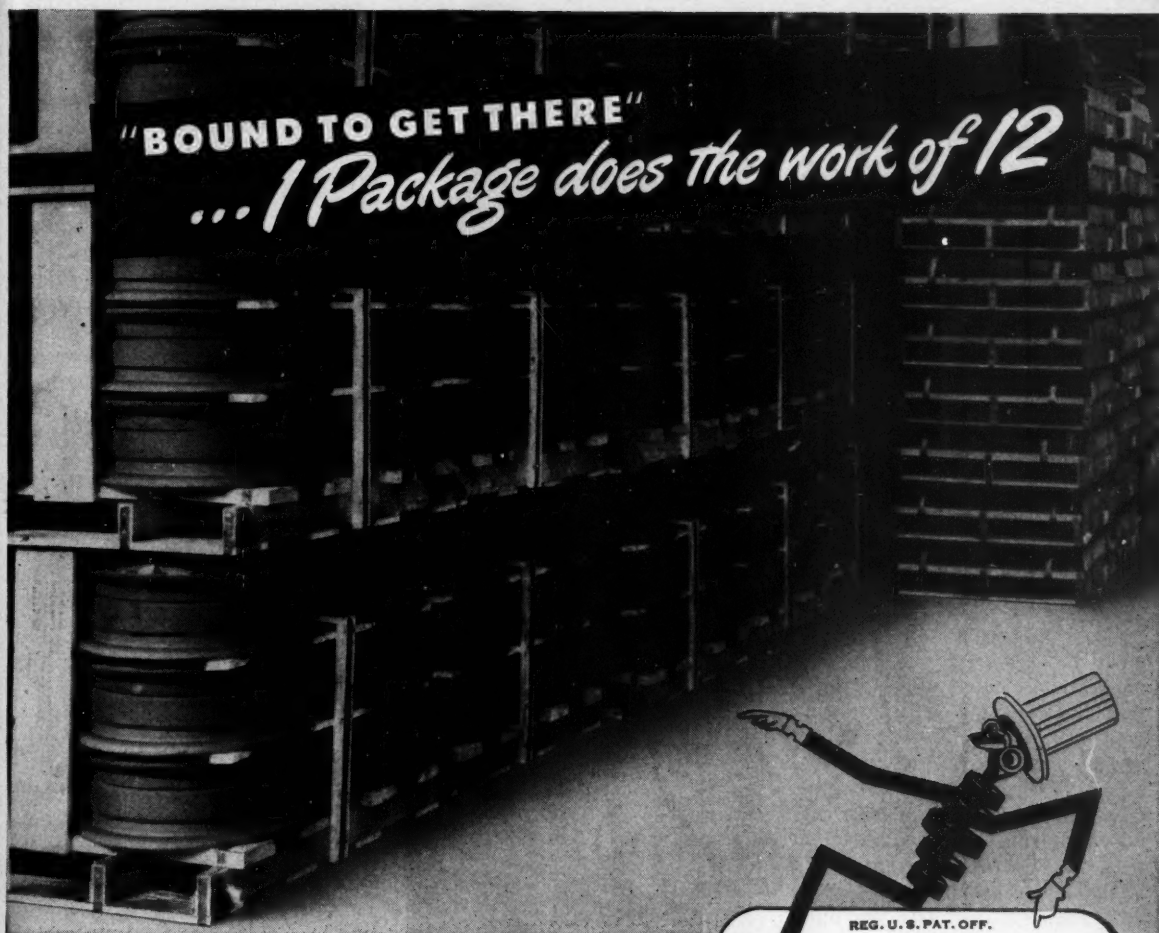
"The receiving department should be large enough and sufficiently well equipped so that incoming material does not pile up, causing unnecessary rehandling and congestion of traffic aisles. The whole area should be sufficiently enclosed so that climatic changes do not affect the operators, or materials, and such elements as snow, ice, rain, and wind do not deter the workers or cause potential hazards.

"Where material is brought to an operator and must be laid on the floor for temporary storage," Mallick stressed, "care must be exercised that sufficient room is given the operator to move about freely without danger of falling over any of it. If fork trucks bring

(Turn to page 55)



**"BOUND TO GET THERE"**  
*... 1 Package does the work of 12*



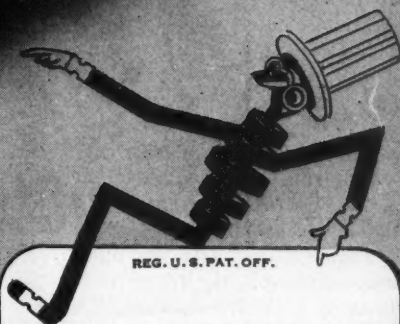
**THAT'S ACME** *Uni-Pak...*

The modern method of shipping and handling a group of packages, semi-finished parts, or finished products . . . made possible by Acme Steelstrap.

Alone or in combination with a skid or pallet, Acme Steelstrap converts individual packages into one unit.

Note the photo above. Twelve brake drums per crate all secured with Acme Steelstrap. In short, one package doing the work of a dozen, and "bound to get there."

Enjoy important savings in time and handling costs, plus hearty "thanks" from the customer end of your shipping line . . . Use Acme Uni-Pak for handling and shipping your products.



REG. U. S. PAT. OFF.

**Acme Uni-Pak  
 Loads 10 Tons More  
 in Single Car**

A shipper of cable reels said . . . "we kept close tab on one of our carload shipments using Acme Uni-Pak. We netted a total savings in dollars and cents of \$81.64 over old methods . . . plus, 20,000 pounds additional cargo loaded in the car . . ."

NEW YORK 7

ATLANTA

CHICAGO 8

LOS ANGELES 11

**ACME STEEL COMPANY**

**ACME STEEL CO.  
 CHICAGO**

SEPTEMBER, 1946



**With thousands of refrigerators coming off the assembly line, any congestion or bottlenecks in the packing and shipping departments would tend to slow the arrival of these units on the waiting market. Here is how the Westinghouse Appliance Division at Mansfield, Ohio, expedites these operations.**

**A**S THE refrigerator arrives on a long slat conveyor it is packed in a pre-fabricated shipping box. These double-face corrugated cardboard boxes are made from prepared sections in a department located adjacent to the line. For assembly of the two sides and top of the shipping unit a rather inexpensive but efficient holding fixture is used. (See photo.) This is designed of light tubing and angles welded together with two channels on either side to hold the sides of the box.

As shown in the photo, one operator can assemble the three parts quite easily without assistance. The swivel-castered truck at the right is used for transportation as well as temporary storage for the sides and tops. To the rear can be seen the line of refrigerators, partially boxed and ready for the front box panels to be nailed in place.

From this point they move to a live roller 90-degree turn, pass down a long inclined gravity section, and finally move on to another live roller section on the main floor, which feeds to the shipping dock. Several hundred feet of conveyor are used in this delivery, during which the refrigerators are transported in an upright position. This means careful handling to avoid upsetting, and therefore the angle of incline used was accurately calculated to give optimum flow from the second to the first floor without danger of forward or side toppling from the lines.

At the loading dock, the refrigerators are removed to the box cars on stevedore trucks. These are used quite advantageously here as

the bulky units can be handled one at a time quickly and safely, and

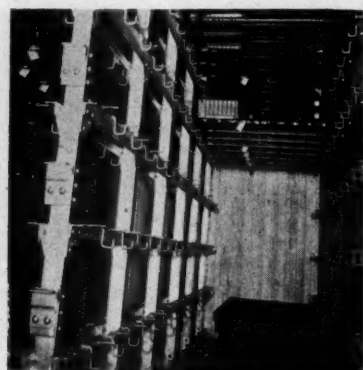


Portable elevator stacking cases in car.

at the same time they can be conveniently positioned inside the cars.

When the first tier of refrigerators has been loaded, a second tier is built by means of a portable stacking elevator, as shown in one of the photos. The cartons are stacked horizontally in this second deck as space is inadequate for another vertical row. The cartons are tilted toward the position where they will rest finally, before the stacker is raised to the full height. This method permits the shipper to use the mechanical advantage of the stacker not only as a lifter, but also as a means of moving the box into position.

Included in these photos are two views showing the arrangement of units (power and freezing units for



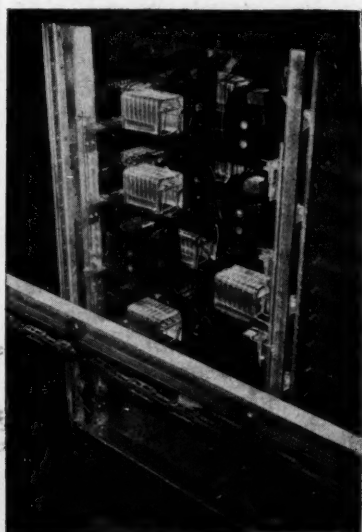
Interior view of car.

the refrigerator) in the box car as they are received from another Westinghouse plant. In Fig. 1 the interior of the car is shown with the heavy steel structural uprights dividing the space lengthwise. At

Holding fixture used for setting up shipping containers.



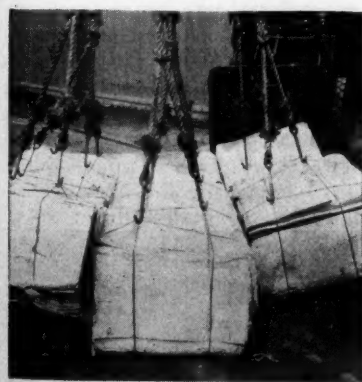
the top of the photo are several units hanging on the supporting hooks. In Fig. 2, the arrangement



Arrangement of units at car door. of units between the car doors is shown. At this location, the parts are lengthwise with the car rather than crosswise as in the remainder of the loading pattern. The monorail conveyor in the foreground carries the units to storage, as mentioned in the article.

#### WOOD PULP HANDLING

**T**HIS photo shows a wood pulp sling with a multiple hook arrangement which is used for handling the material in baled form. The individual bales weigh approx-

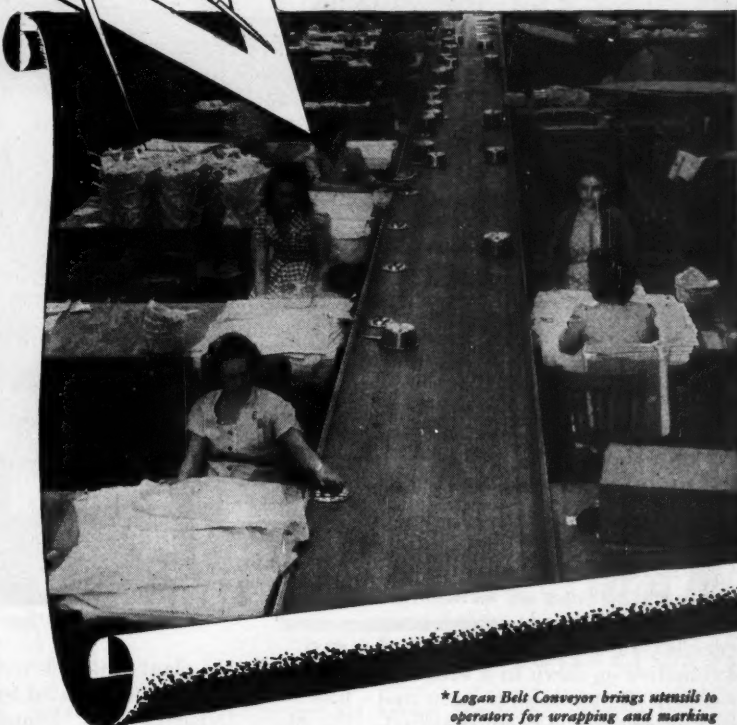


imately 350 pounds. The forged hooks are spliced to the rope ends, which terminate in the sling ring. The mobile crane shown in the background is hauling the load to the rail siding for car loading.—Courtesy, The Jarka Corporation, New York City.

# Engineering

## IS OUR BUSINESS

it's your yardstick for comparison



\* Logan Belt Conveyor brings utensils to operators for wrapping and marking —then speeds them on to packing room.

**Y**ES, you can actually evaluate any conveyor system by the kind of engineering involved, for the conveyor system most likely to give maximum returns in time, effort, and space-savings, will be the one that is best engineered. Many leaders of American industry depend on Logan because they know that every Logan Conveyor is tailor-made, and furthermore is the "type" of equipment best adapted to the particular handling task. When considering your own conveyor problem, include not only the design and construction of the conveyor itself, but the engineering back of it.

## Logan Conveyors

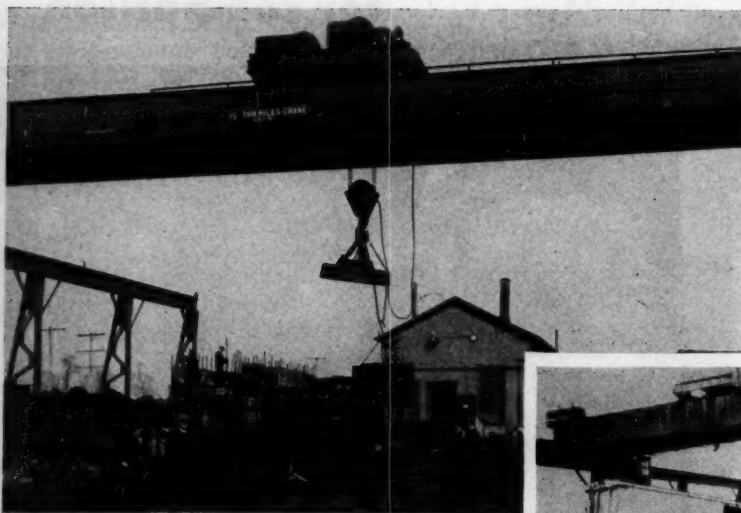


LOGAN CO., INC., 558 CABEL ST., LOUISVILLE 6, KY.



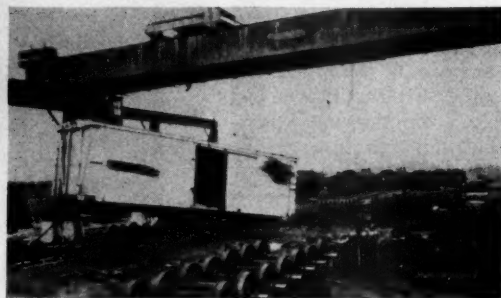
# ERIE RAILROAD'S SCRAP RECLAMATION PROJECT

— A study in efficient handling —



Overhead crane hoisting tierable skid bin. Note magnet remains on hook by use of extra, quickly removable chain.

Lifting car from trucks with overhead crane and cable slings, right.



*In scrap preparation and salvage work, modern handling methods are vital. With the present high level of costs, and the comparatively low value of product, scrap handling—if it is to be profitable at all—must be conducted with a bare minimum of man hours.*

**A**T THE Meadville, Pa., scrap and reclamation plant of the Erie Railroad—where scrap can be anything from an aged locomotive on down to a bent bolt—almost 60,000 tons of worn and cast-off material is handled annually. The importance of refined techniques was recognized early in the plant's 19 years of existence, and as a result procedures, material flow, and specialized tools have been carefully worked out for the thousands of items of equipment which are received from the entire Erie System for disposition.

Indicative of the advanced methods used is the handling of "retired" box cars. Although a substantial proportion of the Meadville plant's overall output is saleable scrap, very little of an old freight car ends up in that category. Some of the dismantled car material is prepared and set aside for miscellaneous uses, but a far larger part finds its way back into other freight cars.

In fact, the salvage of car com-

ponents by the plant is of such volume that it has been designated by the Stores Department as "home" base for many heavy car repair items, supplementing its reclaimed stocks with new purchases to supply the entire needs of the Erie repair shops at Port Jervis, N. Y.,

and Dunmore, N. Y. Such items as couplers, brake beams, truck side frames and bolsters, coupler components and structural elements are shipped for the repair of box cars (steel or wood), gondolas, hoppers, passenger cars, locomotives, etc.

This special buggy for handling couplers is fully described in article. It is one of a number of useful items made from salvaged scrap material.



## "Program" Minimizes Rehandling

The journey of a tired freight car to Meadville starts when it has been "white-lined" by a supervisor at one of the Erie yards. This means that a white line has been painted through the car's identification numbers after an inspection has indicated permanent retirement due to condition or obsolescence. Removed from regular service, the cars are sent to the reclamation plant and scheduled for dismantling. This procedure is scheduled to make available known quantities of reusable materials for others cars undergoing repairs at large program shops in the East.

The "program" is a plan whereby, upon the approval of a committee appointed to make decisions concerning car repairs, cars of a certain serial number are examined and a list is drawn up of the parts needed to restore them to operating condition. The committee then decides on new parts required and reclaimed parts if available. The advantage of this system is the elimination of double handling, as definite quantities can be assigned to a respective repair shop for a known quantity of cars, and installed with a minimum amount of handling.

### Dismantling by Crane

The cars leave the main line on a spur to the plant, and are shunted to the dismantling tracks alongside the "Yard", heart of the scrap plant. Overhead crane ways extend 400 feet lengthwise on either side of the rectangular area. Two railroad tracks extend inside the crane rail columns, as can be seen in the accompanying flow diagram. One track handles incoming material, while the other is used for sorted scrap and reclaimed material outbound.

The cars received for dismantling are positioned at the far end on track "A" (see flow diagram). Here the roof sections are removed and the side lumber bolts are cut free with an acetylene torch. The lumber is then knocked down into the car.

The short strips of lumber are piled crosswise at the doorway of the car, while the long strips are piled at right angles with one end

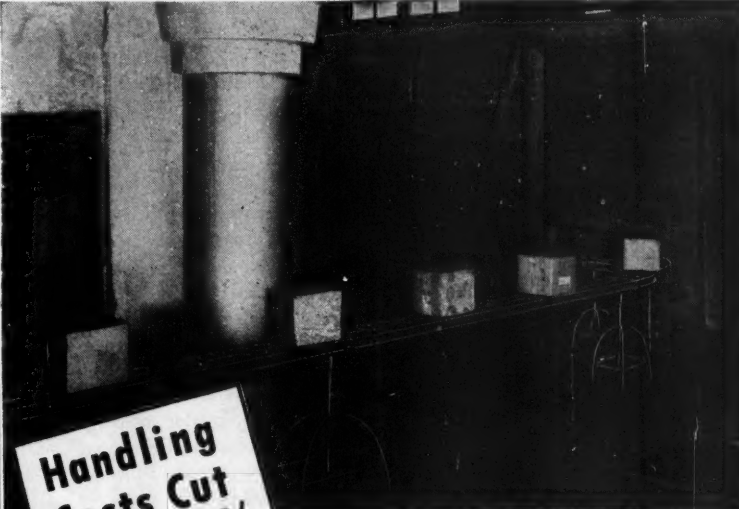
supported on the short ones to facilitate slinging later on. As soon as the side uprights are cut free close to the floor of the car, the are upset along with the top members by use of the overhead crane and a 65-inch magnet. In this upsetting of the unit on the ground adjacent to the car, the side uprights point upward while the top members are down.

The uprights are burned from the roof by torch, and by use of a chain sling the crane removes the car top to a point where other tops

can be stacked upon it. Later, the wood still embedded in the roof structure is burned out.

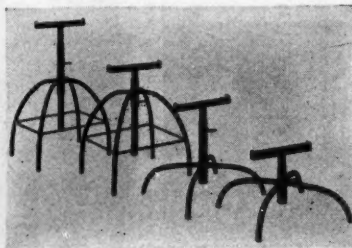
The lumber which is stacked on the car floor is lifted by cable sling and deposited in an open-top car. Later it is shipped to various points on the railroad where it is used in building walks, temporary buildings, cement forms, repairing cars, and other miscellaneous repairs.

The remaining underframe and floor, still on the track, are turned upside down with the crane, and the bolts holding the floor are cut



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free. The underframe is lifted off the floor, and cut apart by torch to free channels for reuse while the remainder is cut into heavy steel

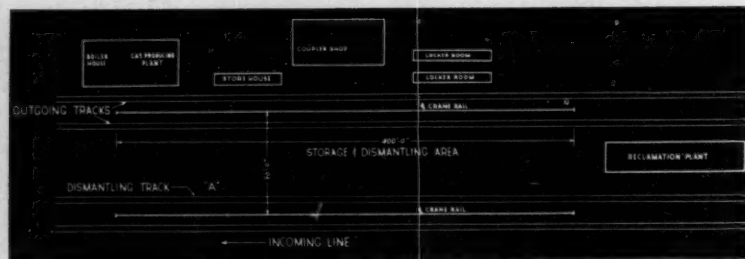
cause their condition does not meet the standards of the Association of American Railroads or, because they are obsolete, are placed into

ding equipment, for the most part designed by the plant personnel and built from scrap material, are used.

A special buggy is used to transport the 300-pound couplers from the storage area to the shop for the first operation, straightening. Two 12-inch wheels support a tubular frame which has a short extension arm. As illustrated, this arm is thrust into the slot of the coupler, and with a slight backward motion, the undercarriage is swung under the coupler, thus lifting it for easy transfer to the shop.

To move the couplers into the furnace for heating before straightening, a specially designed fork is used to grip on a cantilever principle. The fork is suspended by a chain attached to an air hoist mounted on a monorail running from the aisle to the furnace door. The fork is placed in the coupler with the one arm on the inside cavity and the other on the exterior. In raising the fork with the hoist, the more the upward pull the tighter the bearing surface becomes. Since the handle is approximately six feet long, leverage can be maintained because the hoist is attached at the far end of this handle in line with the lift. This handling device is used for both loading and unloading this furnace.

After the shanks are straightened, the couplers are moved to the welding shop by an ingeniously designed tray or skid-plate. A half-inch 4' x 6' steel plate (obtained from dismantled bridges) is used as the supporting surface of the pallet. One-inch round steel eyes are welded at four points along the edge, determined by the balance



General yard and shop layout of reclamation plant.

melting sizes. The floor is picked up by the crane and stacked on the pile of roof frames, where it is burned since the wood is badly gouged and splintered from frequent spiking and cannot be economically reclaimed.

The truck that remains on the track is cut free from the boxes and wheels, and moved to a dock where it is cut into heavy melting steel sizes or cut apart for re-use.

### Coupler Handling Made Easy

Once the car has been dismantled completely, such items as "Z's" (structural members on the sides of the cars), angles, channels, castings, forgings, couplers, draft gears, bolts, and other miscellaneous parts are saved and inspected to determine their fitness or the repairs needed. If the parts are useable as is, they are placed either in open-top cars and made ready for shipment to repair plants, or they are placed in skid bins according to part and size, and stored. Those parts which are not reclaimed be-

open-top cars containing scrap ready for shipment. Those parts which upon inspection can be straightened, welded, plugged, or otherwise repaired, are allocated to various sections in the yard. From these temporary storage points they are moved into the reclamation plant.

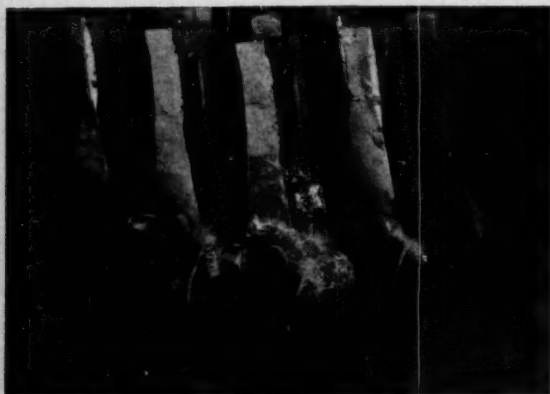
When the couplers are removed from cars, wear characteristics are often present. The butt end, in particular, is usually peened over in mushroom fashion from constant ramming. Likewise, worn couplers received from the line repair shops usually have cracks in one or more locations about the head.

At one time, such worn or defective coupler components were scrapped. With the application of modern welding techniques, coupled with suitable heat treatment, most of these heavy cast steel elements are renewed for useful service.

One entire department in the reclamation shops is devoted to coupler repair. As elsewhere in the plants, specialized tools and han-

Steel tray carrier, made of scrap material, with full load of 12 couplers.

Fork truck moving special tray with couplers between repair operations.

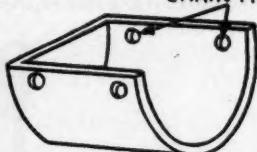


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required for a distributed 3-ton load. Rings are added to the eyes to provide a location for attaching two lifting arms (see photos). These arms (also reclaimed material) have hooks at each end, which

CHAIN HOLES

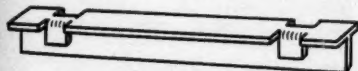


Scrap handling bucket cut from oil tank.

are affixed to the pallet on lifts and detached when the load is in temporary storage. As shown in one of the photos, 12 couplers are placed on a tray by means of the special two-wheel dolly previously described. The forks of the lift truck are caught under the hoisting arms and the 12-unit load is moved to the welding shop. Here the cracks and worn areas in the couplers are restored, and the units are then ready to have the butt end squared.

#### No Lifting Required

For machining the butt end of a coupler, Erie engineers designed a special vertical milling machine with a single point tool to face off the mushroomed surface to a flat one. The machine is positioned at



This T-iron fills gaps between the concrete or wood fillers at crossings.

a 30-degree angle from the vertical and can be loaded by one operator from floor height without lifting the coupler into it. The couplers are brought into the welding department by powered fork truck on the special tray, 12 at a time, and placed next to the machine. By use of the 2-wheel buggy, the operator removes one coupler from the tray and places it into the milling fixture by tilting the buggy toward the machine, which "dumps" the coupler into it.

When the butt end is faced, the dolly is slipped into position and a slight upward-backward motion removes the coupler from the milling fixture. From this point the part moves to a preparation positioner where it has cracks cut out by torch; then to the welding station, and later to a positioner for dress-

ing. Positioners are used throughout to facilitate the many different changes of positions required to prepare cracks, weld and clean the welds and inspect them. Once these operations are completed, the couplers are ready to be normalized in an adjacent furnace.

An air hoist with a tong-type grab is used to place the couplers on the refractory-bedded transfer car. The loaded car is driven automatically by ratchet feed into the furnace. Upon completion of this heat treatment, the handling is re-

versed. The couplers remain on the car outside the furnace until they have cooled sufficiently to be removed with the air hoist. After inspection they are ready to be shipped in open-top cars to Erie railroad repair shops.

#### Only the Squeak Is Lost

Mention has been made of the reservation of scrapped material for adaptation to various railroad uses wherever possible. Ingenuity is the

(Turn to page 50)

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#### WOOD AND STEEL PALLETS

**U**P TO a 40% weight saving is claimed by the Monroe Auto Equipment Company, Monroe, Michigan, in its new line of high tensile steel pallets. A combination type of steel-and-wood pallet and platform skids are also announced.

The wood and steel pallets are made in two sizes: 60" x 48", 16-gauge, 173 lbs., and 48" x 48", 16-



gauge 144 lbs. The all-steel pallet comes in three sizes: 48" x 48", 18-gauge, 83 lbs., 60" x 48", 16-gauge, 128 lbs., and 36" x 48" 18-gauge, 65 lbs. The wood and steel platform skids are in two sizes: 33" x 54" x 12", 14-and 16-gauge, 88 lbs., and 42" x 60" x 12", 11-and 16-gauge, 149 lbs. Steel platform skid boxes and nesting rings are also made by the company.

#### CAR PULLER

**T**HE silent Hoist & Crane Co., Brooklyn, N. Y., now offers a new model electric capstan car

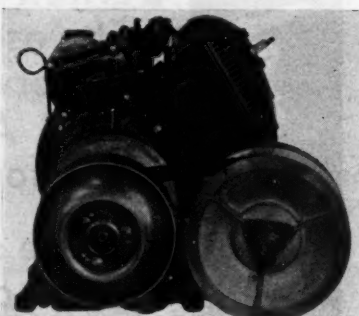


puller in which the gearing is integral with the motor. It is avail-

able in two sizes: a 7½ H.P. unit with a capacity of 5,000 lbs., drawbar pull and a 15 H.P. unit with a capacity of 5,000 lbs., drawbar pull and a 15 H. P. unit with 10,000 lbs., draw-bar pulling capacity. Stock units are available for 220/440 volts, 3 phase, 60 cycles, and also for D.C. service on application.

#### GASOLINE ENGINE

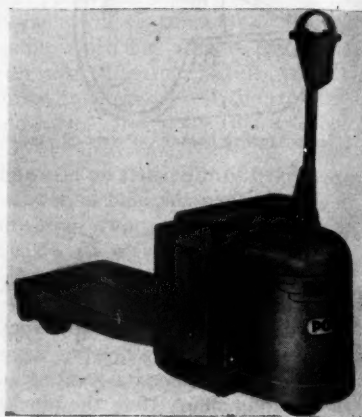
**S**ALSBUry Motors, Inc., Pomona, California, is now producing a 6 H.P. gasoline engine with automatic clutch and automatic transmission, designed to transmit the engine's power smoothly, according to a recent announcement. The engine weighs 56 pounds and develops 6½ H.P.



at 3200 R.P.M. The clutch is engaged by centrifugal force, which also serves to change the gear ratio in the transmission over an infinitely variable range of speeds. It "gears down" the engine for moving heavy loads, while it "speeds up" the ratio during lighter work, claims the manufacturer. The unit may be used with hoists, winches, conveyor systems, bottling and packaging machines, and other industrial applications.

#### ELECTRIC HAND TRUCK

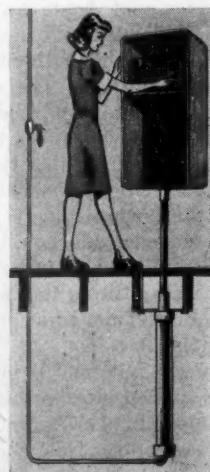
**T**HE Barrett-Cravens Company, Chicago, now offers the Powerox, a new electric hand lift truck. Models are furnished in both 4000 and 6000-pound capacities, with a one horsepower drive motor. Avail-



able in 6", 7", 9" and 11" height, all units have a full 4" lift. The hydraulic mechanism that raises and lowers the platform is an aircraft type gear pump driven by a special one horsepower motor. A 4000-pound load can be raised a full four inches in four seconds, it is stated. Batteries are furnished in sizes from 250 to 400 ampere hour capacity.

#### PNEUMATIC LIFT

**T**HE Samson Jr. pneumatic lift, designed to maintain normal working heights during assembly,



is announced by General Sales & Engineering Company, Chicago. The revolving table is 18" in dia-

meter and  $\frac{1}{4}$ " thick. The cylinder diameter is 4" and is mounted through the floor and a plate to the joists. Capacity can be furnished for 450, 525 and 600 pounds, states the manufacturer. The cylinder is single acting, and hand valve controls furnished as standard equipment. A 48" elevation can be obtained from the floor to the top of the revolving table.

#### MOTORIZED HAND LIFT TRUCK

A NEW motorized hand lift truck is announced by Automatic Transportation Company, Chicago. Called the Transtacker, unit is said to do the work of a fork-lift or high-lift platform truck

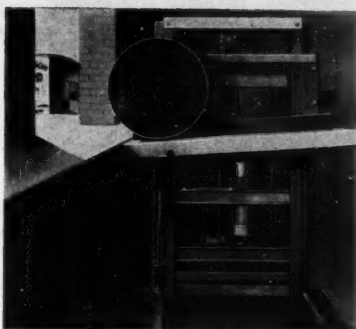


where weight, size, speed or cost make the larger unit impractical.

The model shown is one of four available. It will handle loads up to 4,000 pounds and will raise them 68 inches. The weight of this model is 1,900 pounds. It features fingertip control, which enables the operator to regulate direction, speed, lift and brake all with one hand.

#### BARREL LOADER

MADE by Revolvator Company, North Bergen, N. J., this automatic barrel loader is an adaptation of a short-lift standard portable non-revolvable elevator. The machine is counter-sunk in position so that the top of the platform when lowered is flush with the floor. Barrels are rolled on this platform by hand. The operator then throws the switch and the



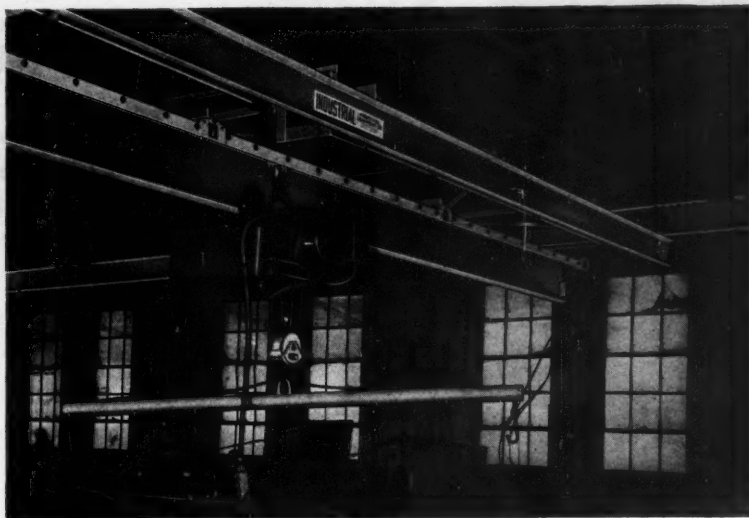
platform goes up. When the platform reaches the correct height for

unloading it is tilted so that the barrel automatically rolls off on the upper level. The platform then returns automatically to the lowered position for another loading.

#### COMPOSITION TRUCK WHEEL

PLASTICS Service Company of Milwaukee is now manufacturing a 5" diameter composition truck wheel called Plaserco. It has a  $1\frac{1}{2}$ " face,  $\frac{5}{8}$ " bore,  $1\frac{3}{8}$ " length of hub and is brass bushed. The wheel comes in black and is of 500-pound capacity.

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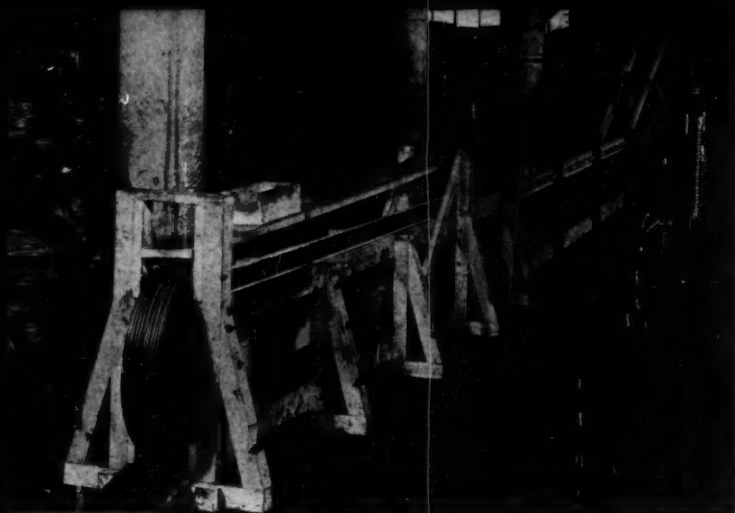
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**1.**  
Coils arrive through this chute from freight car. Note the plank retarder over top of exit.

**2.**  
Specially designed electric stacker is pushed up and down the line as the stockpile is built.

**3.**  
Monorail crane about to hoist 10 coils from powered truck to main floor level. Shown at right is hand truck (note "V" supports) designed for handling with hairpin hooks.

**4.**  
Adoption of powered hand trucks like this facilitates movement of huge chain tonnage.



**2.**



**3.**

## A METHOD FOR STEEL WIRE COILS

*A clever yet simple use of gravity in conjunction with mechanized equipment is enabling The Cleveland Chain and Manufacturing Co., Cleveland, to speed the receiving and storing operations of steel wire coils.*

### Rolling the Hoops

**A**S MANUFACTURERS of all types of commercial chain, the company uses large quantities of steel wire and rod in coil form, which is fabricated in the electric welding department.

The steel coils arrive by freight car. The railroad spur is on the first-floor level, and the material must be transported to the lower

level of the basement storage area. The headroom here varies between seven and 10 feet.

To expedite the transfer of the coils from the cars to the basement, company representatives designed a chute system. (Two chutes are used in the extensive storage area.) Instead of sliding the coils on their sides down a concrete or steel ramp, they are now being *rolled* on end through a chute, which starts



**4.**

at the trap door on the freight car level. The over-all length of the chute is approximately 50 feet. It extends about 30 feet from the end of the inclined section along the basement floor. The total drop from the freight car level is 10 feet. The inside width of the chute's runway measures 10 inches, and the structure is solidly made of 2x6 timber which is reinforced with 4x4 vertical sections bolted at intervals to the frame. (See photo.)

During their travel down the incline the coils develop sufficient momentum to roll a distance of about 150 feet, the entire length of the storage floor, after they have left the chute. This is a desirable feature when stockpiles are built at the far end of the room, where the rolling coils can be conveniently deflected as desired. But when the material is being piled near the end of the chute, the momentum of the traveling coils must be broken.

This was readily accomplished by means of a plank retarder or brake—a 2x10 board about 12 feet long. It is installed at the exit end of the chute, over the runway, thus serving as a brake that is applied from above. The far end of the plank is bolted to the structure to provide a hinge action, and the opposite end is suspended by a short length of chain which can be adjusted to coils of different height. The bolted end of the retarder is of course sufficiently high to permit the coils to pass underneath. But when the rolling "hoop" hits the underside of the plank at the other end, it is slowed to the desired speed.

#### Mechanical Stacking

As the coils emerge from the chute they are deflected according to the location of the stockpiles being built. The weight of the individual coils averages between 165 and 175 pounds, and manual stacking would therefore be both difficult and costly from the point of view of the effort and time required. Here is how the company eliminated manual handling.

A specially designed electrically operated stacker is used for the purpose. The arriving coil is rolled onto the stacker's small elevating platform, which is operated by means of a lever that engages the clutch. The platform is depressed in the center, thus providing a se-

cure position for the vertically standing coil. When the platform has reached the desired height, a slight push is sufficient to tip the coil over on the stockpile. The six-foot-high stacker is mounted on wheels, and its light weight permits the operator to advance it or pull back along the row as the pile is being built.

Handling of the coils by means of the chute system and the mechanical stacker has resulted in a more effective operation within the space arrangement available. The present method has saved about 33 per cent of the time used previously, and thus made more man-hours available for productive effort.

#### Transferring Large Loads

When the coils are needed in the forming department located on the floor above, they are loaded in a vertical position on the bed of a powered truck, which saves handling in a subsequent operation. Usually 10 coils make up a load. The truck moves the material under the span of a two-ton pendant-controlled monorail crane which operates on a traveling beam. As can be seen from one of the photos, the 10 coils are picked up at one time by use of a hairpin hook. The load is then raised to the upper floor level where it is deposited on another powered truck. The latter delivers the material to the forming machines, which form the chains preparatory for the electric welding operation.

Of interest is a type of hand truck which is also used in the transfer of loads between the basement and the upper floor. This operation applies only to a limited amount of a certain type of coiled rod which is put through a special drawing process performed in the basement area. Upon completion of the drawing, these coils are deposited by a hoist on the concave bed of the specially designed 4-wheel hand truck. It is about six feet long and two feet wide and also accommodates 10 coils standing vertically. The supports at each end of this truck are in the shape of a V, thus providing an opening for the insertion of the hairpin hook in the coils.

The use of the crane and the powered trucks has considerably  
(Turn to page 51)



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## FLEXIBILITY OF EQUIPMENT . . .

(Continued from page 22)

are given in the following paragraphs.

### Old Building Adapted to Modern Handling

Since we must be prepared to store exceptionally heavy loads, this proved to be the determining factor in our choice of a suitable warehouse. Our present one-story building was formerly used for metal fabricating purposes, and its one-floor construction affords unlimited floor load capacity. The flooring is built directly on the ground, with a slag-filled foundation. The building is of brick and mill construction, and the high ceilings (16 feet) are suitable for power handling and tiering of loads.

The main operating aisles, laid out lengthwise to the building, are 12 feet wide, which is the normal standard width accepted for 6,000-pound capacity fork trucks. The 48"x48" pallet was chosen because it lends itself to all types of packages without overlapping; it also gives us maximum utilization of floor area. The posts are spaced on slightly more than 12-foot centers. This permits us to place three pallet loads between posts with no waste of space. In a small area where aisle widths cannot be arranged for regular pallet handling we pile such material as coiled wire rod, steel wire or other small lots of heavy type merchandise. Because of the unlimited floor load capacity, pile height can be gained with this heavy material.

Dual tracks are provided at all warehouse doors, an arrangement that gives exceptional flexibility and capacity in unloading and loading operations. For example, a crane will be spotted on the track alongside the building, or on the outside track, permitting it to unload from a car behind and in front of it, as well as from cars on the parallel track. The track capacity exceeds 100 cars, and 20 cars can be loaded or unloaded at the doors at one time. The rail facilities are on three sides of the building, with the fourth side devoted to truck doors. Construction is now under way to increase the number of

these doors so that 14 trucks can be handled simultaneously.

On the truck platforms, counterweighted loading ramps are used, which will fit any height of truck. When not needed, these ramps can



This is type of counterweighted dock board used at truck doors of company's inland warehouse.

be swung up and out of the way with a push of the hand or foot.

### A Single Control for All Locations

As I mentioned in the opening paragraphs, all outside and inside operations are controlled from the superintendent's office in the main inland warehouse. For this purpose large unloading and loading charts are used, measuring approximately 2½ by 4 feet, which are attached to a wall in view of the superintendent's desk. These charts have columns for listing the car numbers, the type of material, location on the warehouse track, the foreman who will be assigned to the job, a space for special instructions, as well as for other pertinent data. These chart boards, incidentally, are faced with a transparent plastic material for a writing surface. Thus erasures or additions with marking crayon can be made as often as necessary without the need of marring or changing the cardboard underneath the plastic material.

Under the supervision of the superintendent, the receiving clerk enters the data on the proper chart. The superintendent then allocates the equipment, manpower, and space necessary for each job. A similar procedure is followed in loading out. In this way every step is planned. This scheduling function, in turn, is also synchronized with the equipment maintenance department.

Since these loading and unloading charts cover our six locations,

the superintendent is enabled to visualize at a glance the operations in progress at any one of them, and to anticipate future operations. According to the information listed on the charts, cranes, fork trucks, trailers, tractors and pallets can be transferred to any location according to need. And our completely equipped maintenance department, which is notified of equipment needs ahead of time, assures that all equipment will be in proper working order and available on schedule at the proper location. The charts are thus useful in eliminating costly waiting time.

### Unit Load in Warehouse Handling

Wherever the product permits, we use the pallet-fork-truck and tractor-train method for moving material between receiving, storage and shipping locations. Cartoned goods, barrels, tires, bags, kegs and all packaged materials are palletized at the receiving point in the cars for movement to storage locations. On the longer hauls, such material will be piled on pallet-bearing trailers, which are hauled in multiple trailer-trains of six to eight units each. If the storage area is within economical operating range of fork trucks, the latter will transport the palletized loads to the assigned areas. When required in the interest of economical and efficient handling, several pieces of equipment are coordinated in a particular task. Some examples of this have been given in the section "Outside and Inside Handling".

Individual heavy skidded boxes (equipped with runners) are handled as a unit by fork trucks or by mobile crane.

Since a great variety of products passes through our warehouse, we must be equally prepared to handle light-weight commodities which may be fragile. This refers particularly to merchandise which would be crushed if the palletized loads were tiered directly on top of each other. We avoid this danger by use of special pallet frames, which are inserted between the overcut of the pallets for tiering purposes. The frames are slightly higher than the palletized loads, and therefore the second and third pallets rest, not on the cartoned goods, but on the end frames. Thus the frames carry all





ATLANTIC CITY MUNICIPAL AUDITORIUM—NOV. 18-22

— Chances are, you will quickly spot the answer to your production problem of the moment at that great Fall gathering of metal men and metal ideas—the 28th National Metal Congress and Exposition, Atlantic City Municipal Auditorium, November 18 to 22.

For at this big annual event, the missing ideas quickly fall into place. More than 300 manufacturers of metals, machinery, and processes will display their latest and most timely production ideas for your convenient inspection. Practically all exhibit spaces in the vast Auditorium and Exhibit Hall have been reserved. Industry will concentrate its latest developments for you in Atlantic City.

And if you don't see your idea in operation in the Exposition, you may hear it explained in one or more of the technical sessions presented by the four great national societies listed below. Never have so many papers and lectures been scheduled during a single Metal Congress. More than a hundred papers will be presented, dealing with metals, heat treatment, welding, cutting and various processing and fabricating techniques developed during the war years.

So plan to attend this Atlantic City Metal Show—mark your calendar now for November 18-22, Monday thru Friday. If you haven't made hotel reservations, do it today—write Housing Bureau, National Metal Exposition, 16 Central Pier, Atlantic City.

#### ATTENTION MANUFACTURERS—

A few good exhibit locations are still available. If you have a product to introduce—a metal industry market to cultivate, wire or phone for space details to W. H. Eisenman, 7301 Euclid Avenue, Cleveland—Phone Endicott 1910.

#### NATIONAL METAL CONGRESS AND EXPOSITION

Sponsored by the American Society for Metals  
in cooperation with

The American Welding Society . . . The Iron and Steel  
and Institute of Metals Divisions of the American Institute  
of Mining and Metallurgical Engineers . . . American  
Industrial Radium and X-Ray Society.

the weight, protecting the product and giving use of cubical space.

Some of these streamlined operations, stated our Executive Vice-President Vernon Williams, were created during the war years, when manpower was scarce and speed in handling an absolute necessity. Today, he added, mechanical handling is serving equally efficiently the needs of our peacetime economy. It is enabling us to make maximum use of available manpower and facilities, as well as time and available space, resulting in economical operations that provide a reasonably priced service.

## SOUND EXPANSION . . .

(Continued from page 26)

work stations without walking for material, small tables are placed at each machine, which hold a quantity of parts ready for grinding.

As soon as the grinding is completed, the parts are placed on trays which are moved on hand trucks into the adjoining plating room. Here, the brackets, screws, nuts, bolts, and other items receive a series of finishes which end with a bright chrome finish.

Parts such as nuts and screws are strung on wires, which keep them suspended and apart during the plating operation. The wires are in turn attached to rods which are hung across the solution tanks (see photo). It may be pointed out that such items as plated nuts are placed in cellophane bags. Thus they are visible in the package, which protects and segregates them until needed for assembly. The bags are placed in wooden trays which can be easily stored.

### Painting, Assembling

Dentists' equipment must be not only precision made, but must have a neat, clean and attractive appearance. This company produces many different enameled finishes. One of the popular ones is called cream white. The painting section of the plant has two monorail conveyor systems coursing through it, which carries the parts on special hooks continuously in and out of the paint booths.

After painting, two separate banks of infra-red lights dry the parts. After the first coat, the

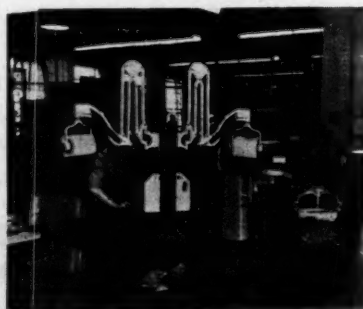
parts are rubbed down and again returned for another coat. During the handling between coats, the painted pieces are moved on four-wheel hand trucks to the rubbing benches.



Units being assembled on four-castered dollies. Note bins for parts at right.

After the final painting operation, the parts are either moved directly to the assembly lines or they are stored in the finished stores until needed. The paper separators are used here also to retain the finish.

In the assembly section, three lines are set up: One for chairs, one for units, and one for X-ray. Separating the three lines are racked bins which hold the component parts used in the progressive assembly. The chair proper is assembled to the large jack assembly, and lifted by a hoist moving on a monorail through the various stations where the other parts are



Two X-ray units attached to castored dolly. Note wrapped parts on bottom of box on wheel conveyor, at left.

added to it. The jack sections are brought to the assembly line on the four-castered dollies mentioned previously. These dollies are also

used to carry the chair into the shipping room after the assembly.

The X-ray units are made in two major types: one is a floor model which has a separate base and can be moved where needed, while the other is a wall model. A special four-wheel castored dolly with an upright center support is used to move this latter type through assembly to shipping. Two units are bolted back to back on this upright and the entire assembly is moved along the line until each X-ray is complete.

The "units" which are, as we mentioned before, the housings which hold the instrument tray, syringes, engine, cuspidor, etc., are assembled in a line between the X-ray and chair lines. To elevate them during assembly they are placed on four-castered trucks which are about 18 inches high. These are pushed one against the other forming a continuous line during assembly.

After the final assembly is completed, the equipment is rolled into the shipping room to be disassembled for crating and shipment. (This partial disassembly is necessary to prevent damage to these precision parts.) The loaded pallets are fed to the end of the line, where the remaining sides and top of the crate (already assembled) are placed over the bottoms.

Steel strapping is used to bind the crates securely. From the conveyor they are moved by hand truck to the shipping platform a few yards away.

## "TAILOR-MADE" HANDLING . . .

(Continued from page 33)

flow in the coat shop follows a horseshoe curve and a straight line in the vest and trouser shops. Finished vests and trousers are routed via the main aisle indicated to "final examining", where the coats arrive from the opposite direction.

It should be borne in mind, however, that the flow diagram is simplified for reasons of legibility. Each of the major departments shown—vest, trousers, coat—is of course subdivided in accordance with the smaller component parts made in it. For example, each major shop has its own sections for making pockets, linings, etc., while others have those for sleeves, col-

lars, and others. At the individual work stations, operators usually work from and to process piling tables, which are double-tiered. The unfinished work is taken by the operator from the upper tier and, upon completion, deposited by her for removal on the lower tier. Checker boys attend to the supply and removal operations.

As the smaller component parts progress through the plant, they arrive at "pairing-in" stations. Here the numbered tickets again provide the proper identification as to style and color. The larger components keep advancing similarly from station to station, and gradually the coat is joined by its pockets, collar, sleeves, etc. The same procedure holds true for trousers, vests and other garments. At each point "that little ticket" tells the operator which part is to be sewn to which.

In rapid succession the nearly-completed garments then receive a general cleaning, edge pressing, marking for buttonholes. At certain points the work stations are closely spaced so that the units can be passed from worker to worker. From the buttonhole marking stations to the pressers, a somewhat longer distance, the garments are moved in castered box trucks. At the pressing station, the units are placed on hangers and hung on pipe racks—one "bundle" to each rack. Though the original bundle of pieces of cloth has now been transformed into neat, finished garments, the unit designation of "bundle" remains. It is the lot of eight to 15 garments designated by the numbered tickets.

The pressed garments are returned to the mobile racks and moved a short distance to the button markers, then to the button sewing operators. Care must now be taken to avoid excessive handling since the garments have by this time received their final pressing. Here's a typical precaution taken. The racks are pushed to the button sewers, who sit on a section of elevated floor which is at a convenient working height in relation to the racked garments. Seated at their stations, the operators are thus enabled to sew on the buttons without removing the garments from the racks.

The racks are then pushed to

final cleaning and inspection stations, and after the last OK the garments are sent via elevator to the finished goods stockroom for assembly. Here the trousers meet the coat and vest—and here again that little numbered ticket unerringly tells which parts were originally cut from the same layer of cloth, thus assuring a perfect match.

### Effortless Handling—Young Ideas

Several noteworthy features may also be observed in the company's shipping department, from which thousands of garments are sent out every week. The weight of the individual shipments may vary anywhere from three pounds to more than 300 pounds. The handling during packing and shipping can be described as effortless. The reason is that here, as elsewhere, the right kind of equipment is supplied for every operation.

The garments arrive on castered racks from finished stock storage by elevator, which is adjacent to the shipping department. A line drawn through the work stations in this department would represent an arc similar to the one in the coat shop. As the garments are removed from the racks they are folded on long tables, ready for the packers. Incidentally, the folders, checkers, packers and handlers attend only to their specific tasks. This specialization of functions is contributing greatly to a smooth, orderly operation.

The packer transfers the orders from the folding to the packing stations by means of castered, smooth-topped tables. Their height is such that the folded work can be slid onto them, then slid off again onto the packing tables. Thus the garments do not have to be picked up, assuring that the neat pressing job will remain undisturbed.

Each station at the metal-topped packing tables is equipped with its own steel banding and wire strapping equipment. The roll of strapping is attached for convenient handling to the side of the table, the coil of wire to a vertical support which is likewise within easy reach of the operator. The roll of strapping is at the left, the wire at the right-hand side of the station. The lighted cartons are wired,

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while those of medium weight are secured with 3/8-inch steel strapping.

The largest shipments are of course too heavy to be packed on these tables, but even the heaviest cases seem to move effortlessly through the department. These containers are prefabricated. Their walls consist of fibreboard, reinforced with wooden cleats along the edges. (Export shipments are packed in wooden boxes.) Preparatory to packing, the fibreboard containers are placed on four-castered wooden dollies (similar to pallet dollies). Their dimensions are approximately 20x24 inches and their upper surface is about five inches above floor level. These containers are pushed on the dollies to the folded garments, which are then packed. The contents of a full box may be too bulky for a snug fit of the lid during nailing. These loads are pushed under a press which has been designed by the company.

The frame of the press, made of pieces of 2x4, is suspended from the ceiling by a pulley arrangement (see photo), and is balanced on each side by a length of belting which is attached to the floor. By use of two ratchets, the head of the press is lowered onto the box positioned underneath. It depresses the lid evenly on all sides simultaneously, permitting the operator to nail it without the necessity of having a second man hold it down.

The nailed box is then pushed on the dolly a short distance to one of two portable steel strapping coils, where a 5/8-inch strap is applied around both ends of the container. (Incidentally, any move between work stations in this department is usually within 50 feet, or less.) Since the ends of the case extend beyond the dolly, the strapping can be conveniently applied without lifting or other handling of the load. Thus the dollies are not only a convenient medium for moving the heavy shipments from station to station, but they also contribute to effortless handling of cases that may weigh 300 pounds or more.

The smaller cartons are segregated on 4-wheel hand trucks for movement to the nearby shipping department, the heavier units are readily transported on the dollies to the outbound trucks.

You can see that this old-in-

years company is keeping up-to-date with modern ideas in material handling. At every step—from receiving through sponging, storing, manufacturing and shipping—specific handling devices and methods are used as aids to production. And this is but another way of saying that the handling and flow methods described are enabling the Joseph and Feiss Company to speed much-needed clothing to consumers waiting to restock their wardrobe.

Is your company equally *young* in its application of handling ideas? Does your plant have the proper handling tools for every type of product and operation? Today's competition and production costs require the answer to these questions to be an unqualified YES.

#### ERIE R.R. SCRAP HANDLING . . . (Continued from page 41)

only limit to working out profitable uses for old material, with substantial savings over scrap value.

The coupler skid-plates are but one example of useful handling equipment built from salvage. Special chip buckets were provided for simplifying the handling of borings and turnings (at the Meadville plant and other repair shops) in a similar "build-it-yourself" manner.

A discarded oil tank (from a tank car) was cut up with a torch into several large buckets. Chain attachment holes were burned (see sketch) in four places for crane

handling, and thus chip buckets were provided. These are used not only here, but also at the other end of the line where the chips are delivered. The buckets were cut in sizes, which when loaded, could be handled with the equipment used by the plants receiving the chips.

Another example of converting miscellaneous reclaimed material into useful items is the crossing "filler", shown in another sketch. The plant uses these fillers between the rails and the wood or concrete center fillers at the many crossings present over the spurs in the yard, to make a really smooth continuous cross-over for powered lift trucks. Using T-angle iron strips about six feet long, eight slots are burned in the top of the T, and the section between the cuts is bent down. These act as wedges which bind against the rail on one side and the wood or concrete filler on the other. Small portable signs are set at these crossings to warn yard engineers when the fillers are in place.

#### Use of Pallets and Skids Planned

In another instance, the plant needed some portable bins for blacksmith coal which could be moved from temporary storage in the yard into the plant. Several steel car sides were burned into four-by-four-foot squares and welded into bins. To the bottom of the bins were welded two 4-inch channels, one on either side, affording enough space for entrance of the forks on the lift trucks.

Eventually it is planned to have

Special skid with detachable tray holding coupler knuckles. Note legs extend above bed to keep tray in position.



most of the material handling at this plant palletized or skidded wherever feasible. The handling of coupler knuckles is just such an example. Being comparatively smaller than most of the items handled, 23 knuckles can be placed on the skids used. As shown in one photo, the skid is actually made in two sections: a tray on top for holding the parts with lifting loops at each of the four corners, and below a skid whose legs extend above the level of its top, to hold the tray in position. Thus, a powered lift truck can be used for on-the-floor movement while the lifting loops make the skid suitable for crane handling.

The plant has requested Erie repair shops to replace a repaired coupler knuckle with a worn one, each time a good one is removed. In so doing, when the tray is ready to be returned to the Meadville plant, it will be automatically loaded with worn knuckles ready for reconditioning.

These are some of the handling highlights of the Erie Railroad's scrap reclamation program at Meadville, one of the outstanding operations of its kind in the country. Careful planning and efficient handling make possible its continuing successful operation.

#### COIL HANDLING . . .

(Continued from page 45)

reduced the amount of floor traffic and handling that was formerly required with a different method. At the same time large quantities of the material are speedily transferred between the two floor levels.

Like many other concerns, The Cleveland Chain and Manufacturing Co. years ago recognized the growing importance of efficient material handling, and consequently the management has progressively introduced up-to-date methods in other fabricating departments.

The finished lengths of chains are deposited on metal-bound skids, which are then transported by the powered hand trucks to heat treating, further finishing or testing operations. The weight of these loads may be anywhere from 1,000 to 3,000 pounds. Thus here, as in the other operations, the work has been made easier and production per manhour increased.

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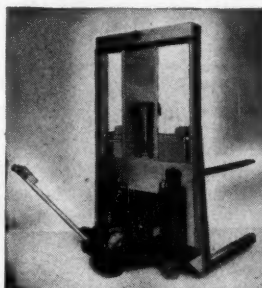
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This unit is equipped with Patented Power Drive and Spring Suspension that holds drive wheel FIRMLY to the floor for traction on uneven floors. Stabilizing caster mounted on frame insures smoother operation and added safety.



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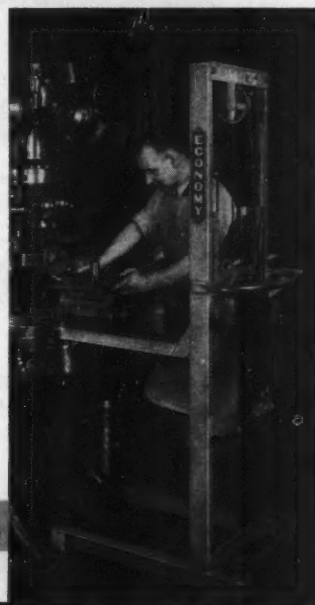
One man can handle heavy dies up to 500 pounds alone. Easily moved about. Also handy for loading and unloading trucks and miscellaneous lifting jobs. Platform 24 in. x 24 in. Lift of platform 4 ft. 6 in. Price \$157.50 (foot operated floor lock optional, \$10.00 extra). Heavier capacities available up to 5000 pounds.

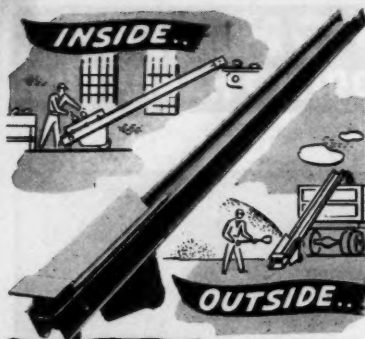
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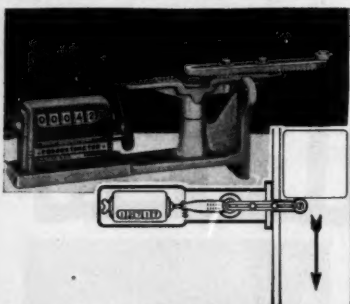
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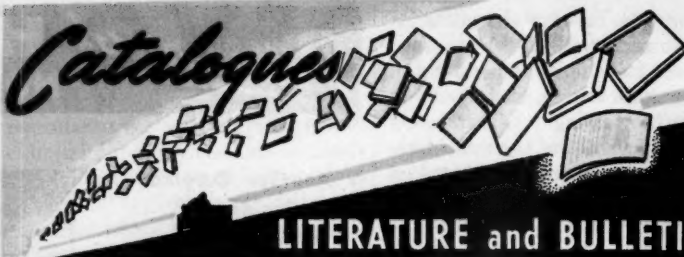
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## LITERATURE and BULLETINS

The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

**213—Bus Ducts** . . . a 40-page data book on bus ducts by Westinghouse. Drawing and photographs illustrate the construction and methods of installation. Engineering information includes standard ratings of main breakers, temperature conversion tables, formulas for determining amperes, horsepower and other data required in correctly applying bus ducts.

**214—Box Truck** . . . a leaflet by G. B. Lewis Company showing various uses of its wood-and-wire woven castered box truck. Photos show stacking trays, shipping boxes, and skid boxes. Applications for the latter are pictured in storage areas and shipping sections.

**215—Steel Strapping** . . . an illustrated publication by Acme Steel Co. on shipping problems. Covered are such diverse materials as aluminum pigs, blood plasma, steel drums, rocket motors and others. Written in story form, the booklet gives case histories with problems in handling, and their solutions.

**216—Metals Guide** . . . a 48-page illustrated booklet by Westinghouse discussing the physical and electrical characteristics of its magnetic metals and alloys. These include Hipernik,

Conpernik, Hipercor, Hipersil, and Puron. A two-page table lists the characteristics of these new metals; sketches show detailed data on their application.

**217—Car Door Opener** . . . a one-man box car door opener is described in a three-page pamphlet released by the Mining Safety Device Company. Photos show the device in use on a car door, with line drawings illustrating opening and closing procedures. Use with no-handle doors is also shown.

**218—Belt Conveyor** . . . transporting operations of bags down and up inclines and around corners are shown in a bulletin by E. C. Horne Machinery Company. Illustrated is the use of a portable, flexible, reversible power driven conveyor. Other applications are also pictured.

**219—Wheel, Belt Conveyors** . . . designed especially for lumber and building supply dealers, are the subjects of a two-color bulletin issued by the Rapids-Standard Company, Inc. Shown are pieces of plate glass being conveyed on a wheel conveyor, long lengths of lumber on curves, and roofing materials being unloaded on a powered belt conveyor.

**220—Hoist Data** . . . information on how to select a chain hoist for the job

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is given in a 36-page booklet by the Reading Chain & Block Corp. Data include capacities, lifting speeds, applications and operating efficiencies of various types of chain hoists. Comparative strengths of wooden trusses and steel I-beams or mounting purposes are discussed.

**221—Collapsible Shipping Box . . .** boxes which can be used over and over again, and can be collapsed are shown in a folder by C. H. Dresser & Son, Inc. Storage and shipping photos show the box collapsed and ready for use. Overall dimensions are given, also space-saving features.

**222—Floor Machine . . .** a machine for polishing, scrubbing, steel wooling and rug cleaning is shown in a tri-colored pamphlet issued by G. H. Tennant Company. Specifications are listed on the drive motor, frame, wheels, and accessories available. Photos are included.

**223—Skid Boxes, Pallets . . .** The Union Mfg. Co. offers a four-page folder illustrating uses for its steel pallets and skid platforms. Also shown are skid boxes and skid racks, the latter supporting 30-tons of bar stock in a storage section.

**224—Rubber Conveying Devices . . .** a 28-page brochure by The B. F. Goodrich Company illustrating various uses of its conveyor belting, V-belts, sheaves, industrial hose for steam, cement, fuel oil, water, etc. Illustrations are included on the use of industrial rubber clothing in acid and alkali areas. Rubber and composition mallets are also pictured.

**225—Industrial Truck Wheels . . .** a two-color bulletin by Pacific Industrial Products Company illustrating its solid rubber-tired industrial truck wheels. One page is devoted to a chart showing specifications for 112 different available sizes, from five inches to 16 inches in diameter. Various applications for dock, machine shop, and storage sections handling are illustrated in line drawings.

**226—Hoisting Device . . .** a new catalogue describing a cam-lever mechanism and chain that lifts steel barrels, plates, etc., is offered by The Boyer-Campbell Co. A special model is also listed for handling corrugated boxes.

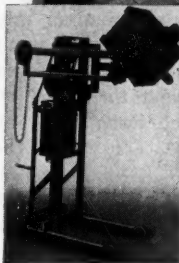
**227—Mobile Crane . . .** a Link-Belt folder on various types of handling with a new mobile crane in yard work, loading freight, etc. Specifications plus descriptive drawings are included; a chart lists the lifting capacities of different models.

**228—Hand Trucks, Lifters, etc. . .** a 68-page catalogue by Service Caster & Truck Division of Domestic Industries, showing detailed drawings and specifications of hand trucks, skid lifters, shop lifters, casters, and also a new gasoline fork truck. A section is devoted to skids and pallets.

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Smoothness of operation and precision of control are *plus* features designed into the better cranes.

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**THE EUCLID CRANE & HOIST CO.**  
1362 CHARDON ROAD • EUCLID, OHIO

## THEY'RE ON THE WAY . . .

(Continued from page 18)

racks are placed across a large storage room encircled by another monorail system, equipped with large metal shelved baskets, which supplies other parts to the line. This system will be explained more fully later.

When the units are needed in production, they are removed from the racks and placed on the same conveyor which delivered them, and thus sent to the assembly line.

### Insulation Handled on Skids

Although the insulation is never seen in the completed refrigerator, it is one of the most important functional items in the assembly. As it is received in large bales, it can be stacked on skids and brought to the storage area by powered lift truck. This area is opposite the unit storage section. The insulation remains on the skids until it is needed in the line. It is then placed on one of the shelves of the basket conveyor.

The "basket" conveyor is used for supplying several smaller parts to the main assembly in a load unit setup. These parts also include the wire shelves for the refrigerators. These shelves are manufactured on the floor above and are sent to the storage section in skid bins. When they arrive there, they are placed on gravity roller sections which roll the skid bins toward the opposite end of the line.

### Gravity Rollers for Wire Shelves

The manufacturing of the shelves is performed over a straight line production layout, beginning at one end with the wire arriving in coils. Tote pans carry the material between machines on gravity roller sections as it is fed through cutting and forming until the shelves are plated, following welding of the narrower gauge stock to the heavy outer edge.

The plating operation is a continuous one using the same type of overhead conveyor as the one in the vitreous plant. Outward bends in the guide channel raise and lower the shelves in and out of the plating tanks as they are supported on ogee-curved swivel brackets. After

plating they are sent to storage in tote boxes via a belt conveyor, which returns the tote boxes after unloading from finished storage to the basket conveyor chain.

The storage area contains the units, the insulation directly opposite, and the shelves on the other side of the units. Since the basket conveyor encompasses the area, both the insulation and shelves can be loaded on it. A monorail hoist is used to handle the large tote boxes loaded with shelves. The hoist removes them from the roller conveyor and positions them at a convenient height for unloading into the basket system. From this point the operator can select the proper series for the refrigerator model being produced, and hang them on hooks provided at each end of the baskets.

As this system carries these parts to the assembly line in another section on the same floor, each basket contains the necessary parts for one refrigerator.

### Sub-Assembly on Padded Jigs

Up to now the handling of the unit, insulation, food compartment, and shelf have been described. The doors of the refrigerator are an item which is sub-assembled adjacent to the main assembly line. They are delivered from another section on a monorail system which parallels the line.

As the doors are removed they are placed lengthwise on a slat conveyor, which has concave padded jigs mounted about three feet apart, two to a slat, and are spaced laterally on about two-foot centers. The contour of the concave surface conforms with the outside shape of the door at its edges. This permits the door to be placed face up in the concave jigs preparatory to attachment of the hardware items, such as the rubber gasket which seals in the cold, the hinge components, the latch, etc. This operation completed, the door is assembled to the cabinet and the refrigerator is ready for inspection. This consists of an operation test and an inspection of the interior and exterior finishes.

### Slat Conveyor to Live Rollers

The color and finish inspection booth is noteworthy for two rea-

sons. First, in line production the inspection must proceed as quickly as assembly operations if the flow of material is to be maintained, which presents a problem at the outset. Second, the accuracy of the inspection dare not change because of the necessary flow. To answer both requirements, the plant engineers designed a lighting arrangement for this inspection section which eliminates any shadows even when the line is flanked on both sides by inspectors. Using standard color gauges for comparison, they can rapidly discern any variation in finishes without slowing or stopping the normal travel of the system.

Once inspected, the refrigerators move on in the line where such accessories as the meat keeper, the crisper, and, in some models, the china butter and vegetable dishes are installed along with a juice pitcher. All this time, it should be remembered, the refrigerators are on the slat conveyor. As they approach the packing section, one operator places a heavy double-face cardboard box over it. The bottom of the box, you will remember, was placed under the cabinet when it first entered this line, and has remained with it until now. At this point the sides are nailed to it, the back is added and later the front.

The boxed units are carried by the slat conveyor to a live roller 90-degree turn, then down a long inclined gravity section and finally to another powered roller line which feeds to the shipping dock.

After five long war years, Westinghouse is again producing these much needed home appliances. Re-conversion and labor stoppages presented obstacles for some time. When you consider that airplane parts were flowing through this same plant only a few months ago, this line in operation is a real tribute to the planning engineer's ingenuity. All of this emphasizes that material handling know-how in war or peace determines how quickly vitally needed products can be produced.

*(The packing and shipping of the Westinghouse refrigerators involves several features noteworthy for their efficiency. These are fully described in the department "Off the Shipping Platform," page 36—Ed.)*

## ON THE PALLET . . .

(Continued from page 34)

or remove the material from the point, enough aisle space for truck maneuvering is important so that the operator is not endangered. These intangible items must be engineered into a layout as much as the machine tool requirements themselves."

**ROBINS** Conveyors, Inc., Passaic, New Jersey, manufacturers of materials handling machinery, announces that its Philadelphia office, formerly at 12 South 12th Street, will be consolidated with that of its parent organization, Hewitt-Robins Inc., Philadelphia, effective September 1st.

**THE** 1947 convention of the American Warehousemen's Association, Merchandise Division, will be held the week of March 16 at the Hotel Jefferson in St. Louis, Mo.

Plans to hold the largest demonstration of modern materials handling equipment is history as a feature of the convention were also announced. A special committee, headed by Albert B. Drake, New York City, Drake, Stevenson, Sheehan, Barclay, Inc., warehousing and materials handling consultants, has been named to arrange the event.

**MORE** than 200 different kinds of industrial products, ranging from opera glasses to road building equipment, are shipped in wirebound containers.

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**INDUSTRIAL SUPPLY BUSINESS**  
Excellent Future  
Owner Wishes to Retire

**A** healthy growing industrial supply business with over 3,000 accounts in Northern California, Southern Oregon and Nevada. Present lines consist of material handling equipment, shipping room supplies, wiping materials, rest room and floor supplies. Sales run over \$250,000 a year, with profits well over \$20,000. These figures can be doubled with additional advertising, salesmen and new products.

Present inventory and fixtures at cost is about \$40,000. Warehouse Building can be bought or rented.

The **GOOD WILL** cost well over \$20,000 to establish to present time. What is this worth to you? For further details with your expressions, write to:

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**One-Man Truck**  
..The Low Cost Way  
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**BARRELS, DRUMS**

Loading and transferring up to 800 lb. barrel or drum loads is NOW an easy job for ONE MAN. He simply runs the Sabin Truck up to container, slips hook on at top—then an easy pull on handle loads truck automatically. Roller bearings make travel easy. **THIRD-WHEEL FEATURE** insures better balance, enables loaded truck to stand alone.

Write for  
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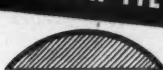
The Sabin Machine Co., 6538 Carnegie Ave., Cleveland 3, Ohio

**ALSO TOTE PAN, BOX, CARBOY, KEG TRUCKS!**

**STEELBINDER**  
STRAPPING TOOL  
"TIES A TIGHTER TIE"

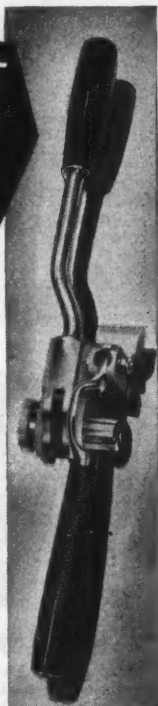


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THE STEELBINDER WAY

The **STEELBINDER** strapping tool places no wedge or lip underneath the strap. Consequently, the strap stays tight, is not loosened, as you disengage the **STEELBINDER**. No need to overtighten. Binds all sizes and shapes, and is the only tool that ties with  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{5}{8}$ " and  $\frac{3}{4}$ " wide steel strap of up to .028" thickness. Cuts off the strap automatically after tensioning. Light, compact, fast, it's the right tool for all but heaviest duty jobs. For heavy duty strapping of .035" thickness, use the A. J. Gerrard **BULKBINDER**.



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The Line That Binds, Braces and Fastens Everything You Ship



FOR HIGH OR  
LOW CEILINGS

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\$3200



### Universal Grab

For picking up all types of heavy boxes, crates, bales or other loads where hooks may be used.

Made of heavy forged steel hooks with an adjustable spread which provides for handling of every size load from 16" to 48". Sturdy  $\frac{3}{8}$ " BBB chains. Capacity 2000 lbs.

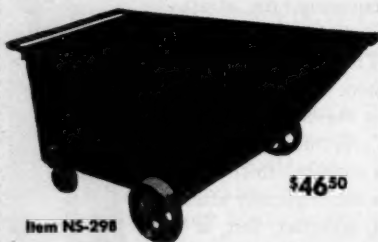
The heavier the load the tighter the grip. Let the "Universal Grab" do your heavy lifting, avoid accidents to your employees.



Item  
B-205  
\$1250

### Drum—Barrel Sling Half-Ton Capacity

Will handle drum for draining purposes. Can pick up drum from lying position and set on end. Use for loading on or unloading truck and for general purpose handling. Will handle barrels, drums, kegs, anything with a lip such as on steel drum or wooden barrel. Simple in construction... easy to operate... heavily welded chain, forged grab hooks. Weight 8 $\frac{1}{2}$  lbs. Air dry enamel finish.



Item NS-298

### Hand Dump Truck

Constructed of heavy sheet steel, reinforced with band at top edge, stout  $\frac{3}{8}$ " round rod iron handle welded to truck. This truck measures 25 $\frac{1}{2}$ " by 45" at the top and 25 $\frac{1}{2}$ " by 27" at the bottom by 17 $\frac{1}{2}$ " deep—carries about  $\frac{1}{2}$  cu. yd. and weighs 125 lbs. Equipped with two 8" semi-steel wheels and two 4" metal swivel casters. Air dry enamel finish.



### Wood Box—Metal Bound

#### "Tilt-Type"

A general utility push truck, "Tilt Type" for easy wheeling and short turning of corners. Built of all hard wood, completely metal bound, all welded construction, no bolts used. Two rigid and two swivel, 5" metal casters,  $\frac{1}{2}$ " tilt. Metal parts air dry enamel finish, wood left natural.

#### TWO STANDARD SIZES

Item PS-91A.....\$3245  
Box measures 24" wide, 36" long, 26" high, weight 185 lbs.

Item PS-91B.....\$3685  
Box measures 28" wide, 48" long, 30" high, weight 260 lbs.

### Hand Truck With Safety Knuckle Guards

Made in two sizes, both sizes supplied with metal or rubber wheels.

Truck is provided with heavy nose plate extending 7" to insure easy pick-up, and secure resting platform for load. Adapted to heavy lifting where limited space prohibits the use of larger equipment. Made with angle iron framework, heavy iron cross bars, welded on.

Furnished with 8" x 2" roller-bearing wheels. Safety knuckle guards protect the operator's hands against injury.

#### TWO SIZES

Item B-491-M-S.....\$1600

18" wide, 42" high—metal wheels

Item B-491-R-S  
\$2000

18" wide, 42" high,  
—rubber tires.

Item B-491-M-L  
\$1950

20" wide, 48" high,  
—metal wheels.

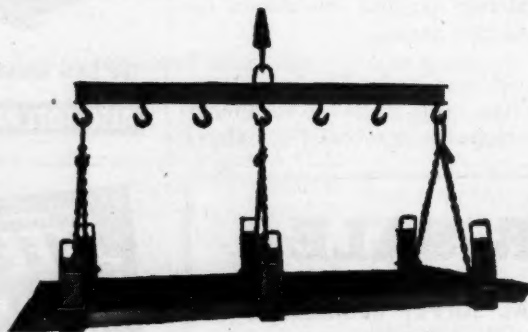
Item B-491-R-L  
\$2250

20" wide, 48" high,  
—rubber tires.

Weight (S models)  
60 lbs.

Weight (L models)  
65 lbs.

All models are air dry enamel finish.



### Sheet Steel Grab

For handling sheet steel in bundles of any size lift up to 9" thick, 18" to 48" wide, and any length. "Grabs" can be used single, double or triple according to size of bundle; illustration shows triple application. Capacity, one ton per

"grab"—total, 3 tons. Holds sheets securely without slippage, distortion or damage to stock. Suited to high or low head room. Supporting beam measures 6' long. Heavily constructed. Weight 190 lbs.

Item NS-364  
Price Complete  
\$15000



### Automatic End Dump

#### For Use With Lift Truck

For handling hot metal parts, scrap stampings, other heavy materials. Rockers geared to the truck. Self-seating, smooth operating. Built of heavy steel plate, reinforced with sturdy angles. All welded construction. Two standard sizes. Air dry enamel finish.

Item S-878-A.....\$10500  
Capacity  $\frac{1}{2}$  cu. yd. Weight 600 lbs.

Item S-878-B.....\$11500  
Capacity 1 cu. yd. Weight 750 lbs.

Be sure to give floor clearance of your lift truck when ordering.

**We Design** and build all types of Trucks, Skids, Pallets, Platforms, Racks, Boxes, Bins, Tables, for Pick-up, Loading, Moving, Shipping, Dumping and Storage.

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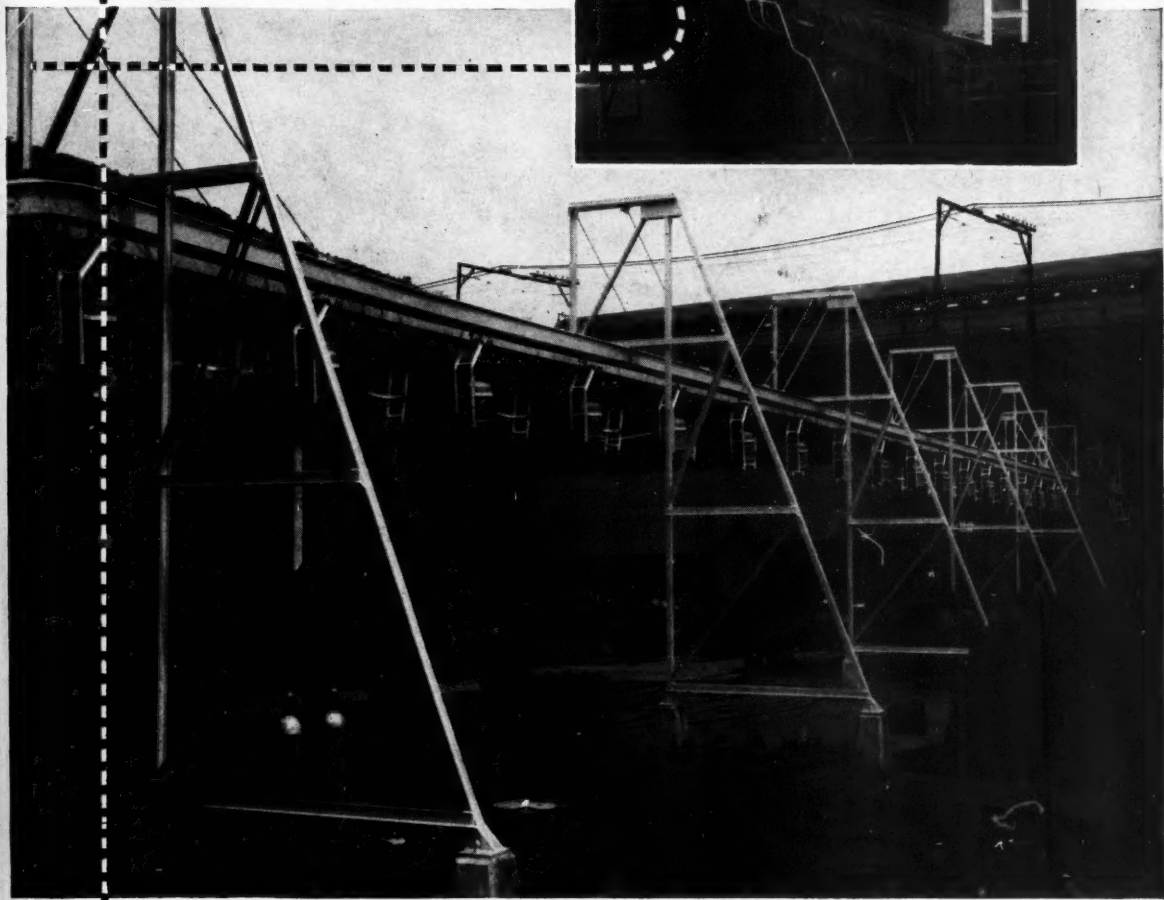
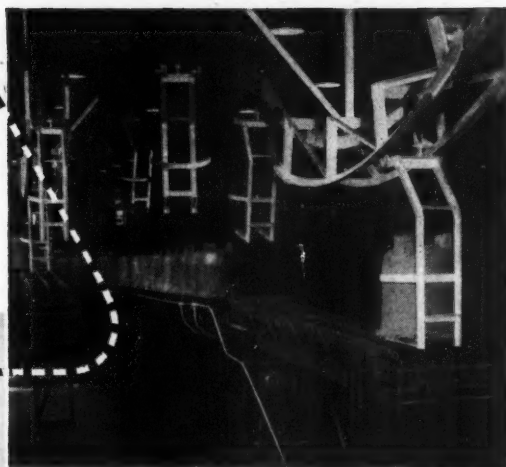
Always give "Item" number; this will help to prevent error. All weights are approximate. All prices are f.o.b. Detroit, Mich. Prices subject to change without notice.

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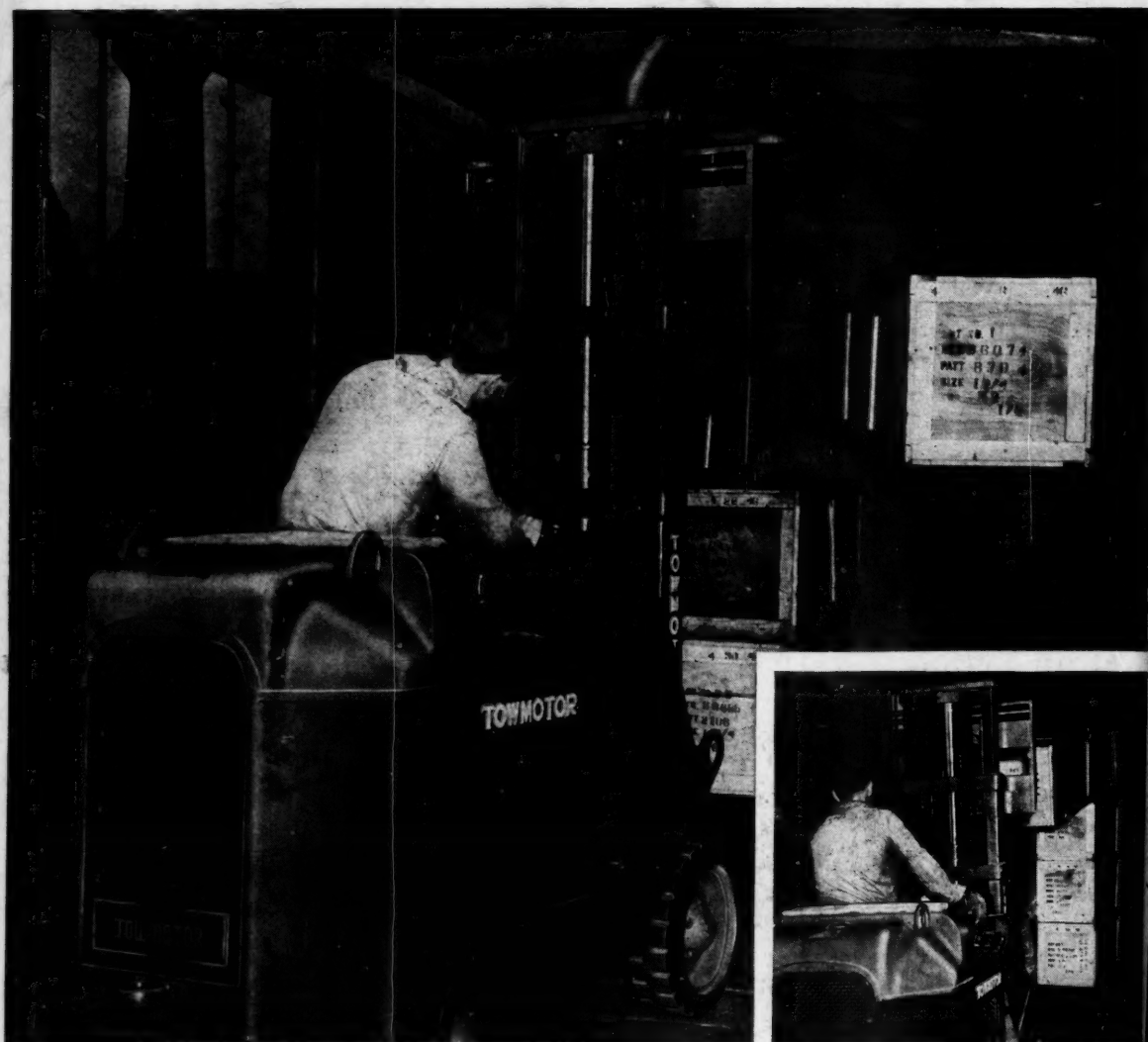
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**L**oading 18-foot long boxes into a freight car is quite a problem in itself . . . especially when each box weighs half a ton. It's enough to give anyone "box jitters." But the Magee Carpet Company, Bloomsburg, Pa., devised a solution to this problem that cut loading time two-thirds and completely eliminated lost time accidents and injuries.

A rigid crane arm and tongs attachment, installed on a Towmotor Lift Truck, is the secret. Boxes are lifted by the tongs, swung deftly and quickly into

place and stacked four high. In loading the top box, one end is set on the third box; the other end is then raised and the box is eased into balanced position. Using a pusher attachment of special design, the box is then nudged into place by Towmotor.

This same Towmotor, with attachments quickly removed, performs normal lift truck service about the plant, unloading and stacking raw wool, transporting rugs and carpets of all sizes and shapes.

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however unusual, there is an engineered solution . . . a solution based on Towmotor experience and "know-how" gained in solving handling problems in every industry. Send for your copy of the Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, Div. 12, 1226 East 152nd Street, Cleveland 10, Ohio.

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